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SIGMUND FREUD, 1856-1939.

A CRITICAL APPRECIATION.

By JAMES DREVER.

WITH the death of Sigmund Freud a world figure of our time becomes a historical figure, and the influence he exerted as a living thinker on his contemporaries, passes into the influence of his thought on the thought not only of his and our time, but on the thought of future generations. We are too near him to forecast with any degree of confidence the estimate which will be made of his real contributions to human thought by the leaders of thought a century hence. It is not even easy for us to assess the influence of his thought on the thought of our own time. It is not so difficult, however, to give some kind of descriptive account of the way in which he appears to be related to investigators in the same or allied fields of past as of present times, and such an account will at least suggest the place which Freud appears to hold in contemporary thought, the services he seems to have rendered, and the debt which his contemporaries seem to owe him. With respect to the reality underlying all this seeming only the future can speak.

Any account of Freud's work must give the fullest recognition to the fact that this work presents two aspects which are really distinct, though they do not always seem to be distinct in Freud's own writings, which has not infrequently misled many of his followers, and on occasion Freud himself. These aspects are, of course, the practical and the theoretical. Unless these two aspects are kept distinct and considered separately it is impossible to get anything but a blurred and distorted picture of Freud's work. In both aspects his work is of the first importance; whether of equal importance—well that depends on the point of view from which one regards the work.

The practical aspect of Freud's work is naturally represented by his development of the psychoanalytic method, which may be said to have given the *coup de grace* to the older somatic psychiatry already seriously challenged by French psychopathology. If one can rightly speak of the more or less systematized body of knowledge gradually taking shape as the rational basis of the psychotherapeutic treatment of mental and nervous disorders as a *science* of psychiatry, then Freud must be regarded as one, if not the chief, of the founders of this science. Of course, he is

not alone among the founders of modern psychiatry. There are others. Yet it may well be that the future will recognize Freud as marking an epoch in the development of the science. The practical aspect of Freud's work, however, has really a narrower reference. It has reference to the development—Breuer must share with him the credit of discovery—of a new method of diagnosis and treatment of mental aberrations and disorders, the method of psychoanalysis. Here Freud stands alone, and whatever the future fate of the method itself may be, Freud's fame as a great pioneer in mental medicine is secure.

Psychoanalysis it is clear—and the same is essentially true of psychiatry—is primarily an art rather than a science. We might go further and say, though not without certain qualifications that will appear later, that Freud was primarily an artist rather than a scientist, if the word 'artist' may be employed in this wide sense. In consequence of this fact it is possible to understand, and condone, at least two characteristics of his published work which the psychologist cannot help feeling to be objectionable. These are, on the one hand, his dismissal of 'academic' psychology as unworthy of serious attention, and, on the other hand, the apparently facile way in which he elevates into a universal principle some hypothesis which he subsequently abandons with equal facility. His mental processes were not those of the scientist. This is clearly shown in his *Interpretation of Dreams*, which remains the greatest, though not the most profound of his works, where constantly and consistently he belittles the results arrived at in the work of his predecessors in this field, on the ground that they do not give him the illumination he seeks, while at the same time he accepts and bases upon these very results a large part of his own theory.

This fact also explains the difficulty which the pure psychologist experiences in arriving at a critical understanding and estimate of Freud's work from a psychological point of view, and in particular the difficulty of incorporating some of the more important and valuable of his findings in a psychology which can be presented as a systematic science. It is notorious that where any psychologist has attempted to incorporate in a text-book of the science any significant part of the Freudian teaching, this always appears as an alien mass which refuses to form any sort of coherent whole with the rest of the matter presented. Psychoanalysis in its present form, indeed, is not psychology as that is understood by the modern psychologist. It is more akin to the psychology of fifty years ago—which is the real 'academic' psychology of which psychoanalysts, and Pavlov also, speak so contemptuously. The time will doubtless come when what is really psychology, and what is valuable

as such, in the Freudian teaching will be incorporated, but that time is not yet.

This leads us naturally to the consideration of the theoretical aspect of Freud's work. The view so sedulously propagated by his followers and apparently to some extent claimed, or at least implied by Freud himself, that his theoretical findings are based wholly on the facts he and his co-workers have encountered in their examination by psychoanalytic methods of patients and other subjects, will not bear a moment's careful examination. However single-minded the seeker after truth may be, he cannot help approaching his facts from a definite point of view, in part unconsciously determined, which has developed under the multifarious influences to which he has been subjected since he first saw the light. Neither the psychoanalyst, nor Freud himself, can claim immunity from the operation of laws the universality of which they assert. The psychologist least of all is prepared to belittle the tendency to draw from facts the conclusions one desires, even when the facts are those met in psychological experiment in the psychological laboratory.

Quite apart, however, from general *à priori* considerations of this type, it is possible to trace in Freud's theories precisely those influences which one might expect in the circumstances. In some cases it is urgently necessary that such influences should be traced, since otherwise it is quite impossible to assign to Freud the credit that really belongs to him, and to give him his due place in the history of human thought.

In spite of his *Autobiography* we do not know a great deal of the individual development of the man Sigmund Freud, but we do know something of the intellectual *milieu* in the Germanic world during his most impressionable years, and it would have been a matter for profound astonishment if no trace could be found of the influence of this *milieu*. Actually traces are to be found in abundance; in fact it is not going too far to say that his whole intellectual outlook, and the foundations of his philosophy of life, were clearly formed and laid in just such a *milieu*.

Freud began his studies in medicine in Vienna in 1875. In that year was published the seventh edition of v. Hartmann's *Philosophy of the Unconscious*. The eighth edition followed three years later, and the ninth edition in 1882, the year after Freud graduated in medicine. The dates are very significant. E. v. Hartmann was a philosopher outside the academic tradition in philosophy and outside the philosophical schools in Germany, and occupying a position more or less analogous to that of Herbert Spencer in this country. Though the two in their philosophical systems were worlds apart, the one representing English thought and basing on Locke, the other representing German thought and basing on

Leibniz, yet there was considerable similarity in the kind of influence they each exerted on young eager minds in their respective countries. On Freud the influence of v. Hartmann's philosophy of the Unconscious is so obvious that attention need only be called to the fact for it to be admitted. v. Hartmann gave him a philosophy of the Unconscious as it were ready-made. That philosophy, deriving from Leibniz through Kant, but strongly tinged with Oriental thought, was in its essentials deeply influenced by Schopenhauer, and much of the pessimism so characteristic of Freud's later work sounds almost like the echo of some of Schopenhauer's words. If then we were to place Freud with his philosophical kin we should place him with Schopenhauer and v. Hartmann.

In 1885 Freud, then a practising neurologist, visited France, and spent some time with Charcot, observing Charcot's methods of treating neuroses. Freud himself did not think that Charcot's influence played any significant part in the development of his thought, and that is the general opinion among Freud's followers. It may very well be true as regards fundamentals. Charcot's system of thought, as well as his philosophical and psychological background, was characteristically French, French psychopathology had a history of its own, entirely distinct from the history of German psychology at this period. Its sources were in Locke and Hume, not in Leibniz and Kant, and in its development it was strongly empirical. That being so, any marked influence on the deeper aspects of Freud's thought was hardly to be expected. Nevertheless the preoccupation of Charcot with subconscious phenomena must have had some influence. It must also be remembered that when Freud returned to Vienna he proceeded for a time to apply Charcot's methods to the treatment of hysteria. Moreover, it is difficult to avoid the conclusion that Freud's theory of *repression* was more or less a reinterpretation from the point of view of his own philosophy of the Unconscious of the conception of *dissociation* current in the Charcot group.

Other influences which Freud himself was always careful to acknowledge were those of Breuer, the real initiator of the psychoanalytic method, and of Jung, the originator of the concept of the *libido*. General psychological developments of the past half century have not had any marked effect, and world movements also, until comparatively recently, do not appear to have affected Freud's thought to any significant extent. The recent influence, however, is notable. Attention has been strongly directed of recent years to phenomena of aggression. This has been somewhat narrowly identified with sadism, but that is entirely in keeping with one of the main lines of Freudian theory.

How then are we to regard the precise contribution of Freud, on the one hand, to present-day thought movements in general, and on the other hand, to the development of present-day psychology? It will be well to reverse that order, and to consider first Freud's influence on modern scientific psychology and the practical application of this psychology in education and other fields.

It is the merest indiscriminating adulation which claims for Freud in psychological science a place analogous, say, to that of Newton in physics or Darwin in biology. Neither by training nor by temperament was Freud a scientist in the strict sense of the word. He undoubtedly possessed psychological ability of a supreme order, but his temperament, as already pointed out, was distinctly that of the artist, and, it may now be added, that of the philosopher, in the creative rather than the academic sense of that word. We might perhaps say that on the practical side he was artist, on the theoretical philosopher. As each of his later works appeared, his readers were more and more impressed by the emergence and development of the philosopher. Looking back at his *Interpretation of Dreams* from the standpoint of *The Ego and the Id*, one sees clearly that Freud's guiding lights from the beginning were of the nature of intuition and inspiration, rather than those which guide the often laborious research of the scientist, rigorously applied logical and mathematical principles. Of course, intuition and inspiration have not infrequently played a very important part in scientific progress. So, in Freud's case, many of his intuitions are in the highest degree suggestive, and some of them illumine psychological regions hitherto wrapt in deep obscurity. But we must discriminate. Intuition and inspiration merely point out and illumine a path to be pursued towards the discovery of truth, and the scientist must pursue that path with rigorous adherence to scientific procedure until the truth is established for all time and before all men. In the psychoanalytic field that part of the work is only just beginning.

While all this is true, it must not be allowed to blind us to the enormous services which Freud has rendered, and to the very substantial achievement in psychology that must stand to his credit. He was not the discoverer of the Unconscious. Nor do we owe to him the vastly important conception of the Unconscious as dynamic. But he may certainly be said to have brought the dynamic Unconscious within the purview of the psychologist as a field calling for psychological investigation. Schopenhauer's ultimate reality as Will was very much in the clouds; v. Hartmann's Unconscious, though less in the clouds, was still so vague and ill-defined that almost any statement could be made about it without much fear of contradiction. Freud's Unconscious as energy

individualized in specific wishes is in a wholly different category. There has too frequently been a tendency to miss the primary sense in which the Unconscious is understood by Freud, and so to lose at the very outset the link between Freudian psychology and normal psychology. The Unconscious for him is the personality as a structure, as dynamic, and as constituted by numerous structural elements determining what the normal psychologist would call impulses conscious or unconscious, but what Freud calls 'wishes.' Freud's Unconscious is not, therefore, a term employed by him as a substitute for the term 'subconscious' as employed by the French psychopathologist to designate a certain group of phenomena. It is unfortunately used sometimes as equivalent to 'subconscious,' but the result of such a usage can only be confusion. The real position is that Freud seeks to account for 'subconscious' and other phenomena by going far deeper than the French school, and in order to do so utilizes a characteristically German concept developed by a succession of German philosophers—Leibniz, Kant, Schlegel, Jacobi and others—until it took a form which Freud could and did utilize to some purpose.

Freud's relentless insistence on the principle that all phenomena in the mental life are as completely determined as are events in the physical universe leads him inevitably to that investigation of the dynamic of the Unconscious, which, whether or not we agree with all his findings, has certainly opened a new and important field of enquiry as far as the psychology of human motives is concerned. He has also laid bare certain processes in the Unconscious, or determined by the Unconscious, which had been only vaguely guessed at, if even as much, by previous philosophers and psychologists. He has added a whole new vocabulary to psychological terminology as a result, and many of the terms he employs are so useful and so appropriate that they have undoubtedly come to stay—such terms as 'projection,' 'rationalization,' 'fixation,' 'sublimation' and the like. It is true there are other terms the status of which is more doubtful. Some of these are confessedly figurative, products of the highly colourful manner in which Freud's mind worked. These will require some kind of translation before they find a place in recognized scientific terminology.

Freud's services in this field, it goes without saying, do not end with the contribution of a new terminology to dynamic psychology. His positive contributions to our knowledge of the most obscure field of human motivation are of the very highest importance. His wider theories may not always be acceptable—some of them represent a definite retrogression rather than an advance in psychology—but they are nearly always sugges-

tive. The mass of factual material, however, which he and his school have brought to light is of immense value for the understanding of the springs of action in the human being, and has given a new orientation to work, both theoretical and applied, in Child Psychology, and in Criminology, as well as in Psychiatry. Particular mention must be made of his contribution to Sex Psychology, though many psychologists would challenge the place given to sexuality in his system as a whole. Then again emphasis on the bipolarity—called by him and his followers ‘ambivalence’—of the affective life is exceedingly valuable, though the part which this characteristic plays in the system as a whole may once more be open to question. There is no need to continue. As far as the science of psychology is concerned, Woodworth’s estimate of Freud is that at which the psychologist is bound to arrive. Freud’s system cannot “rank with the great scientific theories which co-ordinate existing knowledge and serve as guides to future discovery,” but his own observations and the more limited theories built on these “promise to stimulate research,” and his real greatness lies “not in the formulas in which he has cast his thinking, so much as in the thinking itself and the freshness of the approach.” He is a pioneer, and a great pioneer.

There remains to consider Freud’s wider influence on human thought in general during the last two or three decades. Freud’s name was practically unknown except to a very limited circle of specialists during the greater part of his active life. In recent years, however, the name and teaching of Freud have become familiar to every educated man to an astonishing extent. Whether the influence will be as deep and enduring as it is widespread only the future can show. To begin with the wider interest in Freud was largely a hostile interest originating in his emphasis on sexuality, but, while some portion of the hostility to this aspect of his teaching remains, a real and intelligent interest in its wider aspects, and a sympathetic understanding of his teaching as a whole, has gradually developed, as its important practical significance in various directions came to be realized. This has been accelerated as the years passed until the influence of the Freudian psychology and philosophy has come to make itself felt not merely in psychology and psychiatry, but in anthropology, sociology, educational theory, literature and art, and Freud has become a world figure as we called him at the beginning. This culmination of his life’s activity has to some extent been due also to a recognition of the personal characteristics of the man Sigmund Freud, his transparent honesty, his fearlessness, and perhaps above all his open-mindedness and readiness to discard a theory, even his own, when it was shown to be untenable.

THE INCIDENCE OF NEUROTIC SYMPTOMS AMONG EVACUATED SCHOOL CHILDREN.

By CYRIL BURT.

- I.—*Frequency of neurotic and delinquent cases before and after evacuation.*
- II.—*Types of case showing an apparent increase.*
- III.—*Practical suggestions.*

I.—FREQUENCY OF NEUROTIC AND DELINQUENT CASES BEFORE AND AFTER EVACUATION.

During September, 1939, and to a less extent since, I have had some small opportunity for studying the effects of evacuation on school children removed from three of the larger cities in this country. These observations have been supplemented by data communicated by school teachers and by my own former students. By weighting the figures according to age, sex, and reliability, and converting the weighted averages to percentages, it seems possible to obtain some rough preliminary answer to two questions: how far has evacuation altered (a) the *number* and (b) the *nature* of neurotic and delinquent cases among children of school age?

The percentages are given in Table I. For comparison I have prefixed similar figures already obtained in a peace-time survey¹. These were based on investigations made in London; but, as was noted at the time, they correspond pretty closely to the proportions reached by Dr. Lloyd and myself at Birmingham and by myself in an earlier study at Liverpool. And it is from these three areas that the evacuated children, to whom most of my present data relate, have actually been drawn. The figures themselves must be regarded rather as a convenient way of epitomizing a number of first impressions than as embodying anything like a systematically planned inquiry: but they may serve as a provisional starting-point for more intensive work².

¹ *The Subnormal Mind*, p. 336 *et seq.* Within the relevant age-groups the earlier surveys at London and Birmingham covered 373 and 160 cases respectively. The figures for evacuated children are based upon a sample of 157 cases, mostly studied in small groups of 15 to 30 in widely separated reception-areas. The mode of classification—admittedly somewhat arbitrary—is explained in the volume just cited. Judged by the ordinary criterion, the differences in the totals, and in the figures for anxiety-states and incontinence, would appear to be statistically significant. But the reliability of the figures, and the seemingly wide differences in different reception-areas, are questions that must be deferred until the whole problem has been more intensively and extensively investigated.

² I have to thank the many teachers and students who have assisted or sent communications on the subject. With the generous co-operation of the Department of Social Science and the University Settlement at Liverpool, one of our post-graduate

TABLE I.
FREQUENCY OF NEUROTIC SYMPTOMS AND DELINQUENCY AMONG
SCHOOL CHILDREN.

<i>Conditions observed.</i>	<i>Estimated percentage of sample population.</i>	
	1. <i>Before evacuation.</i>	2. <i>After evacuation.</i>
Anxiety-states	4.2	6.3
Neurasthenia	2.4	1.2
Hysteria	0.7	2.2
Anger-neuroses	2.3	3.4
Incontinence	3.4	7.2
Other neurotic symptoms	4.1	5.0
TOTAL	17.1	25.3
Theft	1.5	1.7
Other offences	0.7	1.2
TOTAL	2.2	2.9

To preserve constant and comparable standards is by no means easy. Here, as in my previous surveys, I have endeavoured to divide subnormal cases into two broad categories—(i) serious cases, i.e., those showing symptoms so well marked as to indicate an urgent need for special treatment; and (ii) mild cases, i.e., those showing symptoms sufficient to indicate at least the desirability of further investigation. Before evacuation the numbers were approximately, marked cases, 4 per cent., and mild cases, 13 per cent.—a total of 17 per cent. in all. After evacuation the figures were—marked cases, 5 per cent., and mild cases, 20 per cent.—a total of 25 per cent. Thus, there is no evidence to show that evacuation has greatly increased the amount of 'serious' nervous disorder; on the other hand, it seems certainly to have increased the amount of 'mild' and probably temporary nervous disturbance by about one-fifth. Against this it should be noted that, owing no doubt in

students, Dr. Gertrud Wagner, has been carrying out a study of the psychological difficulties of the evacuation scheme, mainly in Liverpool itself: this, I understand, will shortly be published. Two other students, Miss M. Davidson and Miss I. M. Slade, are undertaking a fuller study of more special problems among Liverpool children removed to Aberystwyth. As a result fuller and more accurate data will no doubt be available, and we hope to be able to publish a more detailed and precise statistical analysis in the near future.

part to the removal from undesirable home conditions, in part to improved physical health, and in part perhaps to the freer outlets afforded by rural life, a good many longstanding cases, serious as well as mild, are reported to have made a definite improvement. Rough as they are, the figures provide a complete refutation (if refutation is needed) of such statements as that quoted recently by a daily paper: "Our children are becoming sheer nervous wrecks."

II.—TYPES OF CASE SHOWING AN APPARENT INCREASE.

But what is far more striking is the change in the relative frequency of different types of neurotic symptoms. Here figures from different reception areas appear broadly to agree. First of all, as might be expected, there is a marked increase of anxiety-states, particularly among the girls, and the younger and the only children. These include cases which the ordinary person would doubtless describe as instances of home-sickness. Among the poorer children the amount of home-sickness is much smaller than I had anticipated, decidedly smaller, I should say, than among new pupils at a boarding school.

The most remarkable feature of all, however, is the great increase in incontinence—chiefly bed-wetting. This, as readers of the daily papers will remember, was often attributed by foster-parents and even by local medical officers to the 'dirty habits of children from the city slums.' Since I have fairly reliable figures for children of the same ages in the same 'city slums' before evacuation, I think it can be definitely asserted that in many cases, if not most, the trouble complained of is not a 'habit' but a new manifestation. In several instances it ceased immediately the child returned to its parents.

Another symptom that has occasionally given trouble is the emotional exaggeration of grievances that have a definite but very slender basis in fact. Pathetic letters, for example, have been received by mothers, chiefly from girls aged 12—14, complaining of the cruelty and hardships of their new environment; and it has not always been easy to discover how much was attributable to hysterical or even to deliberate magnification. Numerous other symptoms of a quasi-hysterical type have been noted, differing widely from one case to another, and not at first sight intelligibly related to the removal: one characteristic, however, they all seem to have in common—namely, they are symptoms which sooner or later might be likely to form a ground for sending the young patient back to his own home again.

There seems to have been little demonstrable increase in definite delinquency. Some of the younger boys have become the subjects of

complaint owing to noisiness, destructiveness, and other displays of assertive excitability—most of it no doubt provoked by the novel appeals to primæval instincts which the country-side so richly offers. As usual, theft has been the commonest of the more serious delinquencies—particularly from shops and stores where the rural shop-assistants had previously had no experience of the predatory tricks of city youngsters ; but in most instances it was easily ascertained on inquiry that the children in question had already been known to steal before they were evacuated : new cases, however, occur among children near the borderline of mental deficiency whose special failings had not been taken into account when they were removed. In three cases town children were reported for imparting sexual knowledge to younger rural children ; and as in the last war, there are always one or two among the older girls for whom the attraction of the soldier threatens to become almost an obsession.

A good many of these disturbances, both nervous and moral, seemed traceable, not merely to the absence of familiar personalities, particularly of course the controlling parent or big brother or sister, but also to the presence of strange personalities and the occurrence of new social contacts. Home-sickness is largely mother-sickness¹ ; and " missing Mum " is the commonest explanation offered by the pining child for his fretting and his sobs. This complaint, where it arose, usually followed immediately on the parting in the case of the younger children ; but only after an appreciable incubation-period in the case of the older. With the majority the transition was eased by the excitement of a ' holiday in the country ' ; as winter approached, however, much of the novelty wore off, boredom began to take its place, and the necessary restrictions (' no going out after black-out,' ' no visits to the cinema without special permission ') came to seem more irksome. According to Miss Wagner's inquiry, covering 275 children evacuated from Liverpool, 94 per cent. were ' very happy ' ; and this proportion tallies roughly with my own impressions. However, it would seem that, of those who were never likely to settle down, the majority returned within the first few weeks, and an appreciable proportion had refused to leave at the outset. About half of those who came back declared themselves ready to be re-evacuated, ' if only . . . ' this or that condition could be changed. Among the evacuees who have remained, those who want to go home seem to be not so much unhappy as bored ; they miss the minor excitements of town life. And in not a few

¹ The reader may be tempted to regard home-sickness as a state of grief rather than as a state of anxiety : but I use the phrase anxiety-state as a technical term covering a fairly definite group of symptoms. Why these should so often follow the sudden withdrawal of maternal support and affection I have endeavoured to explain elsewhere (*loc. cit.*, pp. 235 *et seq.*).

instances boredom has proved a danger both to nervous and to moral health.

The 'dependent child' has naturally been the chief sufferer. But both with them and with others a good deal of moral and nervous disturbance could be avoided if fuller account were taken of the known temperamental and intellectual disabilities of the children, when placing them in their new homes. The minor maladjustments we have noted are of various kinds : a young or timid child placed in the midst of older and more domineering children ; an older or assertive child placed among a crowd of smaller children ; the solitary child suddenly planted in the midst of a strange group ; the child who has hitherto been surrounded by a large family of brothers and sisters finding himself suddenly the only youngster amid a group of grown-up persons ; foster-parents who have had little experience of town children, and perhaps of any type of child, suddenly forced to accept children whom they are unable (and perhaps even unwilling) to understand—these are among the more frequent situations leading to new nervous or anti-social outbreaks. Nevertheless, what is most impressive is the fact that after all the mental health and moral behaviour of the children has been so little impaired. This no doubt is due in part to the remarkable adaptability of the poorer child's mind ; but it is equally a testimonial to the intelligence, generosity, and sympathetic care shown both by the foster-parents and by the teachers who have accompanied the children.

III.—PRACTICAL SUGGESTIONS.

In the press and elsewhere numerous suggestions have been made for easing the psychological problems involved in the war-time evacuation of children. This brief preliminary survey brings to light few proposals that are entirely new ; but it does, I think, serve to indicate which are more important. It throws emphasis in particular upon the following :

- 1.—The knowledge already acquired about the mental, emotional, and social characteristics of the children (much of it deducible from what is known of their previous life at home) should be available for those who are placing and supervising the children in the reception area.

- 2.—This knowledge, coupled with relevant knowledge about the homes and foster-parents, should be taken into careful consideration in assigning the children individually to their new homes. Special attention should be drawn to those who are likely to be unadaptable or difficult. Decisions would be greatly assisted if a memorandum were drawn up indicating what types of home were suitable or unsuitable for particular types of children.

3.—Special hostels or camps should be established for those who, in virtue of physical, mental, or social disabilities, are quite unsuitable for billeting in private homes.

4.—Social workers, with special training and experience in child psychology, should be available in each reception area to examine and to give advice or assistance in respect of individual cases of maladjustment¹. Cases of exceptional difficulty should be referred by them to a fully qualified educational psychologist.

5.—Advice should be systematically given to foster-parents on the management of town children generally and on the handling of special difficulties. Talks have occasionally been given by teachers or school medical officers, with encouraging results: but, if some of the talks are correctly reported, both teachers and school medical officers occasionally need advice from the psychologist. Such general and individual talks might be supplemented by short broadcasts over the wireless.

6.—It is during out of school hours that the strain tells most, and opportunities arise for mischief. Hence it is essential to see that the child's leisure time is filled with wholesome and interesting occupation.

7.—Assistance and advice seem also needed for the children's own parents when they are left behind. There is considerable evidence to show that the separation has caused far more grief, anxiety and nervous strain to the mothers than to their children; and a good deal of nervous instability among the children themselves has been directly precipitated by unwise but no doubt well-meaning actions of their unhappy parents—e.g., by the receipt of emotional letters or by visits ending in fresh tearful partings.

8.—Above all, it should be emphasized that, more often than not, the emotional disturbance is apt to express itself in irrational and unexpected ways. The child who most feels the strain of removal from home may not realize the true nature of his feelings clearly or consciously, and he may show them by new and indirect symptoms, which, to the non-psychological observer, seem quite unrelated to the actual cause, and may even be mistaken, by those who do not know the child, for old or ingrained habits. Of these, incontinence would seem to be the most conspicuous, though it is by no means the sole or the most serious symptom.

¹ The *Annual Report of the Central Association for Mental Welfare*, just to hand, officially announces the formation of a 'Mental Health Emergency Committee,' constituted (with representatives of the Child Guidance Council, National Council for Mental Hygiene, and the Associations of Mental Health and Psychiatric Social Workers) 'to function as a central organization dealing with the carrying on of mental health work in time of war.' The mental welfare of evacuated children is to be included among its special interests. It may be added that social service in mental health has been recognized as a 'reserved occupation.'

14 *Neurotic Symptoms among Evacuated Children*

9.—Finally, I should like to endorse Professor Valentine's suggestion that the evacuation of school children presents not only new problems and new difficulties but also new and unexpected opportunities to teachers. First, as he points out, teachers now have facilities for observing children out of school as well as in, and that, too, under conditions which are in some measure more favourable than before and easier to control. Thus, a vast amount of information could be collected about the instinctive and emotional development of the normal child and its relation to his intellectual growth and interests. Secondly, here are new and relatively unobstructed opportunities for making fresh experiments in curricula and school teaching, adapting both, it may be, more closely to the needs of the child in an environment which is far more natural to the child than that of a crowded modern city.

THE TREATMENT OF INCONTINENCE.

A note on incontinence may be welcome, since this seems the most frequent cause of difficulties. Officials concerned with the boarding out of children in peace-time know how often homes and institutions decline to accept incontinent cases; and therefore it was hardly surprising to find foster-parents in reception-areas registering similar protests. The measures likely to be effective are sufficiently familiar to the clinic psychologist, but often seem unknown to teachers or doctors. Different remedies are required in different cases; and success depends largely on ascertaining the chief cause. Where the symptom is an old one, the fact should be discovered in advance, and the billeting authorities informed. Where the symptom is new, it would appear in most cases to be a fear- or anxiety-symptom. The anxiety-state that supervenes on separation from the mother's care commonly involves a regression to an infantile attitude, and a return to infantile habits. Moreover, whatever increases fear or shyness is likely to aggravate the symptom—e.g., a dark bedroom or a stranger sleeping in the same room. This, however, is but one of several factors. Incontinence is reported among a large number of older evacuees—boys of 12 or 13, girls from secondary schools; and in these cases, and doubtless in some of the younger, the behaviour is often a symptom, not of a fear-neurosis, but of an anger-neurosis, i.e., an expression of repressed resentment or defiance, especially in the rarer instances of diurnal faecal incontinence. For bed-wetting a very common cause is sheer ignorance or shyness about inquiring for, or using the facilities in the new home: a girl of 13 remained four days in her new home without learning where the lavatory was, explaining later that she "didn't know what to say." Obviously the hosts should take the initiative, and that in a frank and friendly fashion. In some homes no facilities are available in the bedrooms, or else they cannot be used without making noises that seem to waken the whole household (e.g., a creaking bed or door). With the majority, as confidence reappears, and most of all as the child acquires a positive affection for his new mother-substitute, this symptom (like so many other neurotic symptoms) seems gradually to vanish. In more obstinate cases

additional precautions can be tried : e.g., cutting off liquids after 5 o'clock ; diminishing diuretics (e.g., tea) ; avoiding foods likely to increase acidity or to irritate the bladder or intestines during the night (barley sugar has proved remarkably effective in certain cases) ; seeing that the child goes to the lavatory just before retiring ; getting him up again towards 11 o'clock, or providing an alarm-clock for the heavy sleepers ; supplying a night light ; providing a rug by the bedside, and, during colder spells, extra bedclothes, or (better still) warmer sleeping clothes and bed socks (partly to prevent the child feeling cold as he gets out of bed, partly because diminished perspiration means increased kidney secretion) ; where the room is exceptionally cold, or there are other sleepers in the same room whom the boy is afraid to disturb, providing a wide-necked bottle to be used as an improvised bedpan ; and, as a last resort, finding a more congenial home. Scolding the child is always more apt to increase the trouble than to relieve it : emphasis on positive success, e.g., by some simple reward or tactful praise each morning the bed is dry—is far more effective than punishment. My colleague, Miss Simmins, tells me that a particularly helpful measure with the older and brighter children has been the keeping of a record by the child himself in a diary or calendar. The whole problem is one of many that might usefully be discussed, not only privately with the foster-parents but also over the wireless. The worst cases should be referred to a psychologist for therapeutic treatment. To the psychologist or doctor I am tempted to say : do not trust too much one type of remedy for all cases. Classify them for treatment. I.—*Mental* cases may be divided into (A) those due to chronic *habit*, (B) those due to more acute *emotional disturbance*. II.—*Physical* cases may be either (C) *functional* : e.g., (i) lax sphincter, (ii) overactive bladder walls ; or (D) *organic* : e.g., (i) thread-worms, (ii) cystitis, bacilluria, (iii) over-acidity of urine, etc. The classes overlap : so that psychotherapy should not be held necessarily to exclude the aid of drugs : (belladonna for C (ii) ; glucose, potassium citrate and increased fluids for D (iii), etc. ; ephedrine, it is said, has proved beneficial in some of the nervous cases). Fæcal incontinence, even with a strong psychological motive, usually responds well to kaolin.

THE PROGNOSTIC VALUES OF THE SUBJECTS OF A SECONDARY SCHOOL ENTRANCE EXAMINATION.

By T. E. STUBBINS

(*Department of Education, Leeds University.*)

- I.—*Scope of the enquiry.*
- II.—*Method of enquiry : correlation coefficients.*
- III.—*Intercorrelations between entrance examination results.*
- IV.—*Regression coefficients.*
- V.—*Conclusions.*

I.—SCOPE OF THE ENQUIRY.

It is now generally accepted that there is a marked lack of correlation between the results obtained by candidates in their secondary school entrance examination and those subsequently obtained in their school certificate examination. The entrance examination has been the subject of a considerable amount of adverse criticism, and modifications have been introduced into it by some examining authorities with the view to obtaining entrance examination results more closely in agreement with school certificate examination results. In some cases the effects of such modifications have been followed up by careful investigations¹, usually involving the correlations between the entrance examination results and estimates or marks supplied by the head masters of the secondary schools attended by the successful candidates. These investigations suggest that the introduction of an intelligence test into the entrance examination improves the degree of correlation between the two sets of results.

The results which form the basis of the present article were obtained in an attempt to probe the problem rather more deeply than the previous reported investigations, which generally deal with the school certificate examination results as a whole. Correlation coefficients between each of the four parts of an entrance examination and each of nine parts of a school certificate examination were obtained. The aim of the investigation was to try to discover if any part of the entrance examination agreed more consistently than any other with the results obtained in the various papers

¹ Previous investigations on this subject, reported in this *Journal* by Mr. D. AMOS, vol. I (1931), Mr. J. W. COLLIER, vol. III (1933), and Professor GODFREY THOMAS, vol. VI (1936), show that the results of the particular intelligence test used were more closely related to an estimate submitted by secondary school head masters than were those of the English and arithmetic papers taken in the entrance examinations.

taken in the school certificate examination. If it could be shown, for example, that the intelligence tests results obtained in the entrance examination agreed more closely than those obtained in the other parts of that examination with the results obtained in school certificate English, history, mathematics, etc., then it might be possible to consider the placing of greater reliance on the intelligence test results as compared with the other results when it became necessary to differentiate between candidates occupying border line positions in the final order of the entrance examination.

II.—METHOD OF ENQUIRY AND CORRELATION COEFFICIENTS.

The marks employed refer to two groups of candidates. Group A consisted of some 180 boys, all of whom took the same entrance examination in 1930 and the same school certificate examination in 1935. Group B consisted of a similar number of boys who took the corresponding examinations in 1931 and 1936 respectively. In each group the pupils were evenly divided between the same five secondary schools. The total numbers actually taking the school certificate examinations from the five schools were about 300, but in order to keep the groups as homogeneous as possible the results of pupils taking six year courses, four year courses, and of those taking the examination for a second time were disregarded.

The entrance examination consisted of attainment tests in English and arithmetic, an intelligence test, and included an estimate mark supplied by the head masters of the elementary schools attended by the candidates.

The same method of procedure was adopted with each group. The marks obtained in each part of the entrance examination were correlated, by the Pearson-Product-Moment method, with those obtained in each of nine papers taken in the school certificate examination. The coefficients of correlation thus obtained are given in Tables I(a) and I(b), in which coefficients greater than five times their probable errors are italicised. On statistical grounds only such coefficients can be considered to be significant, and not the result of chance selection.

It will be noted that none of the coefficients involving school certificate history and chemistry was significant. In the case of Chemistry the distribution of the marks within group A, as revealed by a histogram, suggested that the 1935 chemistry papers were of a difficult nature for those particular candidates, but no marked deviation from a normal distribution of marks was apparent in the remaining chemistry paper, nor in the history papers. In the case of geography, only one coefficient, that involving the 1931 intelligence test, was significant.

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TABLE I(a).

CORRELATION COEFFICIENTS BETWEEN ENTRANCE EXAMINATION MARKS
AND SCHOOL CERTIFICATE EXAMINATION MARKS (GROUP A).

<i>School certificate subjects.</i>	<i>Entrance examination subjects</i>				<i>Number of Candidates</i>
	<i>Arithmetic</i>	<i>English</i>	<i>Head Masters' Estimates</i>	<i>Intelligence Test.</i>	
English language.	·136	·360	·355	·254	185
English literature	·155	·310	·321	·164	185
History	·144	·194	·185	·070	180
Geography	·200	·185	·198	·090	149
German	·140	·313	·215	·240	124
French	·154	·365	·270	·200	159
Mathematics ...	·315	·117	·281	·359	185
Physics	·217	·091	·176	·271	113
Chemistry	·056	·026	·133	·151	108

TABLE I(b).—CORRELATION COEFFICIENTS FOR GROUP B

<i>School certificate subjects.</i>	<i>Entrance examination subjects</i>				<i>Number of Candidates.</i>
	<i>Arithmetic.</i>	<i>English.</i>	<i>Head Masters' Estimates.</i>	<i>Intelligence Test.</i>	
English language.	·200	·400	·308	·296	181
English literature	·046	·278	·084	·222	181
History	·025	·202	·072	·124	167
Geography	·046	·156	·154	·347	154
German	·068	·314	·218	·026	110
French	·225	·342	·298	·220	150
Mathematics ...	·319	·197	·314	·318	181
Physics	·144	·294	·170	·359	107
Chemistry	·047	·163	·089	·266	103

III.—INTERCORRELATIONS BETWEEN ENTRANCE EXAMINATION RESULTS.

A detailed examination of the correlation coefficients was not attempted as the coefficients were not altogether trustworthy on account of the possible existence of high intercorrelations between the parts of the entrance examination. If the elementary school head masters based their estimate mark solely on an English test, then it would be natural to expect similarity between coefficients involving the head masters' estimates and the English test marks; incidentally, unless the head masters' marks also correlated highly with the marks obtained in the arithmetic examination, a candidate of high ability in arithmetic and average ability in English might be unjustly penalized in comparison with a candidate of high English ability and average ability in arithmetic, as the latter would tend to receive the higher mark in the head master's estimate.

The intercorrelations between the parts of the entrance examination are given in Tables II(a) and II(b), and they imply that no candidate would have gained any unjust advantage by the inclusion of the head masters' estimate marks in the final total of the entrance examination.

TABLE II(a).

INTERCORRELATIONS BETWEEN ENTRANCE EXAMINATION MARKS (GROUP A).

	<i>Arithmetic.</i>	<i>English.</i>	<i>Head Masters' Estimates.</i>	<i>Intelligence Test.</i>
Arithmetic	—	.207	.669	.329
English	—	—	.593	.322
Heads' estimates ..	—	—	—	.397
Intelligence test	—	—	—	—

TABLE II(b).—INTERCORRELATIONS FOR GROUP B.

	<i>Arithmetic</i>	<i>English.</i>	<i>Head Masters' Estimates.</i>	<i>Intelligence Test.</i>
Arithmetic	—	.349	.717	.312
English	—	—	.526	.389
Heads' estimates ..	—	—	—	.380
Intelligence test	—	—	—	—

While these intercorrelations were of importance in themselves, their effects on the correlation coefficients of Tables I(a) and I(b) were of still

greater importance. The coefficients of correlation between the marks gained by Group A candidates in English language, and those obtained in the corresponding English entrance examination and head masters' estimates were .360 and .355 respectively. From Table II(a) it was apparent that there was high correlation between the marks obtained in the English test and the head masters' estimates, so that before the relative importance of these two sets of marks could be assessed it was necessary that the coefficients should be modified in such a way that allowance was made for the high intercorrelation.

IV.—REGRESSION COEFFICIENTS.

The regression equation affords one method of obtaining the required modified results. Theoretically, such an equation should enable a candidate's score in a particular school certificate subject to be calculated by substituting in it the candidate's marks in the various parts of the entrance examination. The equation is of the form :—

$$X_1 = aX_2 + bX_3 + cX_4 + dX_5 + k$$

in which X_1 represents the candidate's score in a school certificate examination subject; X_2, X_3 , etc. the same candidate's scores in the parts of the entrance examination; k is a constant; and a, b, c and d are the regression coefficients or the weights to be assigned to the appropriate entrance examination mark in order to obtain the best possible estimate of the candidate's mark in the school certificate subject denoted by X_1 . It is hardly to be expected that the entrance examination will reveal all the factors necessary for success in any school certificate subject, but it is interesting, and important, to know the relation existing between the actual and the predicted scores, as it is a measure of the reliability of the regression equation. This relation, known as the coefficient of multiple correlation, can be computed.

For the particular purpose for which the equation was being employed, the regression coefficients were the important items of the equation, for, generally speaking, a high positive coefficient meant that the corresponding entrance examination mark was of relatively high value in estimating the mark gained in the school certificate subject. There are a variety of methods of determining the regression equation, and in order to have a most desirable check on the accuracy of the rather involved mathematical computations two methods were used, one due to Yule², and the other to Doolittle³. Tables III(a) and III(b) contain the regression coefficients and the coefficients of multiple correlation for the various school certificate subjects.

² G. UDNEY YULE: *Introduction to the Theory of Statistics*.

³ F. G. MILLS: *Statistical Method*.

TABLE III(a).—REGRESSION COEFFICIENTS FOR GROUP A.

	<i>Arithmetic.</i>	<i>English.</i>	<i>Head Masters' Estimates.</i>	<i>Intelligence Test.</i>	<i>Coefficient of multiple correlation.</i>
English language.	—·35	·54	1·00	·30	·43
English literature	—·16	·59	·86	·08	·36
History	·28	·59	·14	—·08	·23
Geography	·53	·58	—·08	—·06	·24
German	·27	1·20	—·11	·51	·36
French	·09	1·45	·17	·31	·38
Mathematics ...	·61	—·27	·37	1·00	·42
Physics	·57	·01	—·16	·90	·30
Chemistry	—·24	—·41	·63	·50	·18

TABLE III(b).—REGRESSION COEFFICIENTS FOR GROUP B.

	<i>Arithmetic.</i>	<i>English.</i>	<i>Head Masters' Estimates.</i>	<i>Intelligence Test.</i>	<i>Coefficient of multiple correlation.</i>
English language.	—·08	·86	·35	·38	·44
English literature	—·06	·99	—·33	·47	·31
History	—·14	·96	—·10	·27	·22
Geography	—·33	·11	·34	1·06	·37
German	—·29	1·43	·77	—·32	·34
French	·095	1·29	·61	·24	·37
Mathematics ...	·58	—·04	·50	1·01	·50
Physics	·26	1·03	—·53	1·28	·40
Chemistry	—·09	·42	—·20	1·04	·28

From Table III(a) it will be noted that the weight to be assigned to the head masters' estimate mark was almost twice that to be assigned to the English mark when attempting to predict school certificate English language results. From the corresponding correlation coefficients—Table I(a)—it would have been concluded that these marks were of equal value

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for estimation purposes. Other examples, emphasizing the doubtful nature of conclusions based solely on the correlation coefficient occur in the figures relating to English literature, French and mathematics in Group A, and French and mathematics in Group B.

Inspection of the coefficients of multiple correlation—Tables III(a) and III(b)—indicated that the equations for history in both Group A and Group B were of doubtful value for predicting school certificate marks, and it would appear that the entrance examination under review did not reveal all the factors necessary for success in school certificate history.

The equations for English language and English literature suggested that of the four parts of the entrance examination the English examination results would prove the best guide in attempting to predict success in either of the school certificate subjects. The weights assigned to the head masters' estimate mark varied too much to warrant its use for prognostic purposes.

The coefficient of multiple correlation for geography in Group A was small, so that no great reliance could have been placed on the weights associated with that equation, particularly as they were not confirmed in the corresponding Group B equation. The high positive value of the weight assigned to the entrance examination intelligence test mark in Group B was, however, of interest. In 1935 the school certificate geography examination contained, for the first time, a paper requiring short answers to a large number of questions covering a wide range of facts, and bearing at least a superficial resemblance to the intelligence tests used in the entrance examination. The higher weight associated with the intelligence test marks in Group B as compared with Group A may represent the results of attempts on the part of teachers to meet the needs of the new type of school certificate paper, in the light of experience gained in the previous year's examination.

There appears to be little doubt that the entrance examination English marks would have been of most use in predicting marks in both school certificate French and German. Here again there were marked variations in the weights associated with the head masters' estimate marks, and in practically all of the school certificate subjects so far dealt with the entrance examination arithmetic mark carried a negative, insignificant or unreliable (geography) weight.

In the equations for mathematics and physics the intelligence test marks carried the highest weights, the English and head masters' estimate marks varied too much to be considered reliable. The arithmetic mark in three of the four equations carried the highest weight assigned to that mark in any equation. The two subjects mathematics and physics were

the only ones in which the particular arithmetic marks used could have been of any use in the predicting of school certificate results.

In the case of chemistry no conclusion could be drawn. The Group A equation had a very low coefficient of multiple correlation, and could not therefore be regarded as being reliable. The high positive weight associated with the entrance examination intelligence test in the Group B equation was of interest as Group A candidates encountered, for the first time, a new type of school certificate paper, similar in construction, though naturally different in content, to the new geography paper previously mentioned, while Group B would have been able to benefit by the experience gained by Group A.

V.—CONCLUSIONS.

Previous investigations have tended to show that the results of intelligence tests in the entrance examination to secondary schools usually agree more closely with the secondary schools' head masters' estimates than do the results of the other parts of the entrance examination.

In the present investigation an attempt was made to determine which of the four parts of a particular entrance examination agreed most closely with the results in individual subjects in a school certificate examination, the ultimate aim being to determine the values of the four parts as means of predicting school certificate results. The marks of two groups of candidates were utilized—Group A, consisting of about 180 boys who took the entrance examination in 1930 and the school certificate examination in 1938, and Group B, also of about 180 boys, who took the corresponding examinations in 1931 and 1936 respectively.

The entrance examinations for each group consisted of attainment tests in arithmetic and English, an intelligence test, and also included an estimate mark supplied by the head masters of the elementary schools attended by the candidates. The results of each part of this examination were correlated with those obtained in each of nine school certificate subjects.

The investigation suggests that in the schools and examinations studied :—

- (1) The entrance examination English results would have been the most reliable of the four sets of results in predicting marks in the majority of the school certificate subjects.
- (2) The elementary schools head masters' estimate marks would have been of practically no predictive value.
- (3) The intelligence test would have given the best prediction of success in school certificate mathematics and physics.

- (4) The arithmetic marks gained in the entrance examination would have been of little use for predictive purposes except when used in conjunction with the intelligence test marks when attempting to estimate success in school certificate mathematics.

The above conclusions have been based on, and strictly refer to, particular sets of results. It is not suggested that they are capable of universal application, or even of application to other examinations of similar content and purpose conducted by the same two examining authorities. The results of a further group of candidates might modify the conclusions, as a set of entrance examination marks was considered to have prognostic value only when it could have been used in connection with both Group A and Group B. There were parts of the entrance examination which might have been used for predicting marks for Group A candidates, but the corresponding entrance examination results could not have been used with Group B and *vice-versa*. The head masters' estimate mark, for example, could have been used for predicting marks to be gained by Group A candidates in English language and English literature, but the estimate marks given to Group B candidates would have been useless for the same purpose. On the other hand the entrance examination English marks could have been used with both groups in predicting marks to be gained in English language, English literature, German and French.

In drawing the above conclusions allowance was made for the possible existence of high degrees of resemblance between the parts of the entrance examination and also for the fact that in some cases, notably history and geography, the agreement between the entrance examination results and the school certificate results were not more than might have been expected as a result of chance selection.

In conclusion the writer desires to express his indebtedness to the two examining authorities for their ready co-operation in supplying the necessary data, to Dr. Ll. Wynn Jones of the Department of Education, Leeds University, for much valuable constructive criticism, and to Dr. C. W. Valentine for help in the preparation of this article.

THE SPECIFIC NATURE OF TEMPERAMENT TRAITS AND A SUGGESTED REPORT FORM.

By C. W. VALENTINE.

- I.—*Introduction: the purposes of the report forms.*
- II.—*The specific nature of temperament traits:*
 - (a) 'sociability,' (b) 'reliability,' (c) 'sympathy,'
 - (d) 'aggressiveness,' (e) 'anger,' (f) 'submissiveness,'
 - (g) 'initiative' and 'leadership.'
- III.—*The value of records of more elementary processes.*
- IV.—*Notes on the use of the report forms.*
- V.—*A suggested report form for temperament and social behaviour.*

I.—INTRODUCTION.

THE report forms below are based on some which I have been giving in recent years to students, for training in the psychological study of a few children, usually in the infant school. It had been my intention to experiment with them further for a few years for several purposes.

First, to gather evidence as to social behaviour or temperament traits of certain specific types among young children, especially from two or three to six or seven years of age. Norms in the proper sense are both difficult to make and of doubtful value owing to the great individual differences in these traits, and also owing to the inevitable variations in standards of different observers. Nevertheless, extreme cases at least can be noted with some reliability, and some facts as to their frequency at different ages gathered.¹

A second aim was to throw further light on the problem of what are unitary innate temperamental traits. This problem, of course, is complicated by the fact that even innate tendencies are liable to modification by environmental influences. If, as suggested in the report later, one record is made not long after the child's entry into the school, and another some months or a year or so later, significant and rapid changes would suggest at least that the earlier traits are not entirely innate; yet even here one must recognize that some changes may take place through mere maturation, and through changes in physical health.

¹ More reliable norms can be established where several observers work in close collaboration with detailed standards (see CYRIL BURT, *The Young Delinquent*, Chap. IX).

A third purpose was to see if there were any connection between unusual extremes and later development, normal or abnormal. If such connections were found it would be important for the earlier detection and treatment of future 'difficult' or 'problem' children. For we seem to need a much fuller knowledge of the temperamental characteristics of the great majority of 'normal' children at given ages before we can suggest that certain things are abnormal or signs of coming abnormality.¹

A fourth aim, and perhaps the most important at this stage, was simply to experiment with a special type of report form to aid in the discovery of the most valid type psychologically which is also of value for practical purposes.

The evacuation of so many children from their homes provides unique and immediate opportunities for such observations—opportunities which may be gone in a very short time, as we hope. Many nursery school teachers are now actually living with their children nearly all day, sleeping in the same room at night, and practically taking the place of the mother to them. Many teachers of older children are spending much more time with them than is usual, organizing evening occupations, etc., and in some cases boarding in the same house as a group of their pupils.²

Undoubtedly such teachers are very hard worked; but some enthusiasts with psychological training may find time to note down a few observations each day, provided they have some guidance and the requisite report forms handy to reduce writing to a minimum.

For these reasons I am reproducing these report forms without further experiment with them as a supplement to those already recommended in my note in the last number of this *Journal*, namely, the forms

¹ Professor Burr on the basis of his wide experience in testing and observing normal backward and delinquent children, and taking 'emotional control' as a criterion of development, suggests that a child 'who shows less emotional control than would be manifested by an average child of half his age' should be regarded as 'temperamentally defective'—and he thinks that these would be about 1½ per cent of the whole population. The next 10 per cent he would label 'temperamentally unstable'. This is a useful criterion to bear in mind; but as Burr points out, it must be taken to refer to excessive emotionality in all or most emotions. (See C. BURR, *The Young Delinquent*, pp. 512, ff.) The problem is complicated further when we get to the characteristic increase of instability at adolescence. As to individual traits (e.g., anger and pugnacity) several observers have noted fluctuations and peak years in early childhood.

² Nursery school teachers who have known their children intimately before have a special opportunity of observing changes in behaviour, after the change of environment. The changes in some children are undoubtedly great; for example, my daughter, on the staff of a nursery school which was evacuated to a camp school in the country, reports that so quickly do most of the little ones of three and four years adjust themselves to the change and to the absence of the mother that within a few days or even hours they cease to fret for her. A visit from the mother may disturb them again, but not in all cases and rarely for long. In one case just reported to me the child cried when the mother spoke of taking her home and away from her school and teacher.

given in *The Educational Guidance of the School Child*¹, and the development scales for use in the observation of nursery school children given in *The Social and Emotional Development of the Pre-School Child*.²

The reasons which lead me to draw up for our own purposes of child study and research a new report form are given in the next section. I may preface this by saying that the word 'temperament' is here taken in the broad sense as covering those aspects of mental life which are primarily conative or affective, tendencies to act or feel, and not in the narrower sense as those qualities which are determined by special physiological factors, though it may include the effects of these, particularly glandular.³

II.—THE SPECIFIC NATURE OF TEMPERAMENT TRAITS.

(a) In psychological reports upon temperament it seems to me that inadequate attention is sometimes paid to the complexity of the traits covered by the names used; indeed, sometimes one term may cover several specific and relatively independent tendencies. For example, take the term '*sociability*,' often listed as a single temperament trait. A middle-aged man may vary considerably in the degree of friendliness towards (a) adult males of a similar age, (b) very old men, (c) very young men, (d) women of about the same age, and so on. And within these various classifications again there are, of course, marked differences of responses to different individuals.

Personally, I should even find it difficult to know whether to classify myself as 'sociable' or not. A large number of people make me feel indifferent as to social intercourse with them. On the other hand, there

¹ Under the authorship of H. R. HAMLEY, R. A. C. OLIVER, H. E. FIELD and SUSAN ISAACS, with a Foreword by Sir PERCY NUNN and an Introduction by KEITH STRUCKMEYER (London: Evans Bros., 1937). The report forms given in this book, being meant for school records, rightly give a good deal of space to attainment in different school subjects, and to special intellectual abilities and interests. My own suggested report forms are in no way intended as a substitute for such complete school records, being concerned only with temperament and the signs of future 'normal' or 'difficult' development.

² By KATHARINE BRIDGES. (London: Kegan Paul, 1937.) Dr. Bridges is now revising an account of the application of a new development scale for infant school pupils which it is hoped will appear in this *Journal* shortly. Correspondence with Professor Burt about my own paper and report form, which he kindly read in proof, revealed that he was making an investigation on evacuated children, and he has been good enough to write an interim report of this for this number of the *Journal*, which, it is hoped, will also stimulate and guide other investigations. The June number of this *Journal* will contain a detailed report on evacuated children in Cambridge by Dr. Susan Isaacs.

³ Thus the term 'temperament' is used here in accordance with the interpretation of CYRIL BURT in his *Subnormal Mind* (p. 43) or his *Young Delinquent* (pp. 339-400), and not in the narrower sense as used by W. McDougall in *The Energies of Man* (p. 176, ff.). Burt adds to his definition that these temperament qualities are "not pervaded by intelligence."

are a good many people with whom I delight to enter into conversation, whose presence I always enjoy. There are a few indeed whom I should enjoy having almost always with me. Is one to balance great desire for the society of a few against a relatively mild liking for the society of a considerable number?

As to children, one child may show delight in the society of children of about the same age and sex, but appear indifferent to much older children or much younger children. On the other hand, there are, I think, some children who are especially friendly towards children somewhat younger than themselves, but who do not seem to wish to associate so much with those older. Again, one child may constantly seek the society of some companion not minding much who it is, but hating to be alone: yet he may dislike the group, while another child seeks a group and may himself try to form a 'gang,' not contented with the society of only one other.

No doubt the term 'sociable' is useful as a first rough designation. Too many fine details may not be convenient in reports on temperament or character which are to be made and interpreted by persons with little or no psychological training (though even here the use of general terms has its own special dangers).

Hence, for the purpose of school records to be made by the teacher, broad classifications may be convenient. Indeed, in the enquiry described in the book referred to above (*The Educational Guidance of the School Child*), the original length of the report form was deliberately reduced by combining under one heading items that had a good deal in common—e.g., 'social interests,' though the authors emphasize that they do not suggest that the qualities listed are distinct 'psychological entities' or 'faculties.'

(b) This method, however, though a time-saver for the teacher, inevitably loses in exactitude, and for research and even at times for practical purposes has its disadvantages. Consider, for example, the term '*Reliability*,' used in the report just referred to (p. 93). This is interpreted as follows: "Is he truthful, does he lie or romance? Can he be relied upon to take care of things and behave in the same way when the teacher is not present as when she is watching him? Will he torment the younger child if no grown up is near?" But are not the three items included above under 'reliability' largely independent? How would one mark on the five-point scale a boy (a) who has never been known by the teacher to lie, and (b) who does not torment younger children, but (c) often gets into mischief when the teacher is out of the room—surely a not uncommon type?

For the purposes, at least, of psychological research on the development of children we need greater detail than these semi-popular terms of 'reliability,' 'sociability,' and so forth. We may begin with a reference to 'general sociability'—defining it, perhaps, as I have done below, as a tendency usually to seek some society; but then we should go on to supplement this by reports on more specific reactions to children of similar age, to younger children, to older children, to children of the opposite sex, because limitations to one of these groups may prove of significance for future development. I would like to add a further distinction between 'sociability' in the sense of constantly seeking the society of some one individual or other, and 'gregariousness' proper in the sense of seeking to link oneself to a group or larger company. This tendency, by the way, to form or join a small gang occurs in some children astonishingly early—in a few at the nursery school age.

(c) The trait usually labelled '*sympathy*' also includes a number of different and relatively independent responses. There are different sympathetic responses to (a) the pain, and (b) the pleasure of others; and (apparent) sympathy with pain may or may not be accompanied by an effort to relieve or help.¹ Again, some children who seem unsympathetic to the troubles of children of their own age, and are even aggressive and quarrelsome with them, are sympathetic and protective to children younger than themselves. This may prove a promising trait in a difficult child, round which a more favourable character may grow.

In reference to active sympathy or the protective tendency (as with some other tendencies) it is a familiar fact that a great difference may be observed in the child's attitude to his own brother or sister and his attitude to other children. For example, one evacuated nursery schoolboy of four, described as a 'regular tough'—seizing and keeping the best toys, constantly fighting, defying the teachers if only by loud contradictions—is very tender to his little brother of 2; 0, calling him to share his chocolate and entering vigorously into his defence if needed.

(d) Again, consider the general term '*aggressiveness*,' or '*pugnacity*.' It makes a great difference to our judgment of this according to whether it is directed against the weak and helpless or against the strong and tyrannical; and it is possible that in a boy of 8; 0 or 10; 0 (a) teasing or hitting *younger* boys may be a sign of the future bully or tyrant,

¹ McDougall defines 'active sympathy' as 'actively seeking to share your experiences' with another (*Outlines*, pp. 424-425). This seems to be an unfortunate use of the term, unnecessarily divergent from the common usage, which implies showing sympathy by active help and is more equivalent to the expression of what McDougall calls the 'protective instinct.' In the example given above the child's 'protective instinct' is roused by the smaller child (a natural object of such protection) but does not 'spread' to an older child in trouble.

(b) occasional fighting of those of his own age may be of no special significance, while (c) the attacking of *older* bullies, like :

“ Some village-Hampden, that with dauntless breast,
The little tyrant of his fields withstood ”—

may be the sign of later courage of a nobler type.

Some children may, no doubt, be quarrelsome and aggressive with all three age groups, but we ought to be able to record the tendencies separately if they do occur in isolation.

Of course, the notes on individual points must be taken in conjunction with others which may interpret them. I have before me, for example, a report on one boy, age 8 ; 6, who was very pugnacious with children of his own age and older (‘ aggressiveness ’ being marked *A* in the five-point scale), yet to smaller children he ‘ offers help ’ and helpful sympathy with younger children in difficulties is marked *B*. This boy was regarded as a real problem by the teachers ; the helping of younger children may prove a redeeming feature, but it is modified by the report that he announces to other children the names of those whom he has been helping, and that he constantly seeks to attract the attention of children around him. This affords a good example of the need to consider finally the reports on all the various traits together.

(e) A distinction should probably be made between (a) exhibitions of *anger* and (b) *aggressiveness or pugnacity*. Though normally anger may accompany fierce pugnacity as McDougall asserts, my own observations of very young children suggest that they may be found independently ; at least, a child may be apparently very angry and yet refrain from aggressive action (and not always from helplessness), or a child may be aggressive and indulge in fighting without the usual signs of anger. (I do not here refer merely to ‘ playing ’ at aggressiveness, as a child may play at almost any form of instinctive activity.)

The distinction between occasional outbursts of temper and more prolonged sulkiness may also prove important, and almost certainly if either grows to excess it needs a specific form of treatment. Sulkiness should also be distinguished from general irritability which is probably caused in most cases at least partially by some abnormal bodily conditions.

(f) As to *submissiveness*, it is a matter of common knowledge that a child may be obedient to one person and yet be quite uncontrollable by another : and the former (or latter) may be a nurse and the other a parent ; or the child’s attitude to one parent (or teacher) may be very different from the child’s attitude to the other parent (or teacher). No doubt some children are *generally* disobedient and others generally

submissive to all adults and older children at least ; but a group (probably, I think, the great majority, but how large at present is unknown) are reasonably submissive to some and defiant or at least resistant to others.

(g) Consider also the terms *initiative* and *leadership*. There may be leadership of a dominating and even aggressive type. On the other hand, there may be leadership which is due chiefly to the leader having original ideas, and being able to show how they can be carried out. Initiative may also show in purely personal activities, which have no relation to other children.

In both these types of initiative the intellectual aspect may be prominently involved ; but I have thought it well to include initiative as one item in the report on temperament. Here, as elsewhere, one cannot avoid overlapping among some sections.¹

III.—THE VALUE OF RECORDS ON MORE ELEMENTARY PROCESSES.

The advantages of trying to analyse the supposed general traits into their unitary elements so far as possible seem to be these :

First, by learning more precisely which of these traits can co-exist in an extreme degree with others in a mild degree, we can decide better which are genuine elementary and specific tendencies. This in itself would be a useful contribution to general psychology.

Second, we may be able to hit upon some elementary types of behaviour which at a given age are signs of later undesirable development, the signs of the future 'problem' child. Here detailed records of 'problem' children in the clinics may prove illuminating.

Third, a more analysed report gives a more accurate account of the child as he is at the time and is not so apt to mislead as when the more general terms are used which, in some senses, may be actually inapplicable to the child.

No claim is made that the items in the report form do now represent unitary traits ; probably, in some cases, further analysis could and should be made.

The detailed reference to many specific actions, such as are given by Dr. K. Bridges in her " Social Development Scale," have the advantage of greater objectivity, when an action (e.g., crying when a toy is taken away) is recorded simply as either (a) having been seen, or (b) not having been seen. It has also an advantage for the teacher with little or no

¹ Professor BURR calls my attention to the fact that there is a kind of dependence which is of an emotional kind, a craving for the presence of the mother or other trusted person. Although, as he adds, this is hardly a unitary innate trait, it is a point of special interest in some evacuated children and is included in the Report Form under emotional dependence.

training in psychology; and many of the detailed forms of behaviour given by Dr. Bridges might well be added as typical examples under various headings in the report form which here follows, especially when nursery or infant school pupils are being observed.

But to those who believe that man does possess and reveal certain innate tendencies which can be traced in many acts of behaviour even varying somewhat in details, it will appear that an attempt to classify reports in accordance with these innate tendencies is more likely to reveal a significant description or 'profile' of an individual, than one based on either more general and therefore ambiguous terms, or on unclassified items of behaviour.¹

It will be seen that the classification headings used in the following Report Form correspond in most cases to the instincts or innate propensities as listed by McDougall. While from the first I could never agree with certain points in McDougall's discussions and enumeration of instincts in his *Social Psychology*, I still think that, especially with his later modifications, they give a substantially sound list of innate tendencies in man, with the proviso that they need further analysis in the way suggested in the report form following.²

McDougall's list gains further confirmation by the evidence given by Burt that the misdemeanours of juvenile delinquents fit neatly into the scheme of innate tendencies as formulated by McDougall.

The type of analysis suggested in this paper does not, I think, conflict with Burt's own doctrine of a general factor running through all the innate instinctive or emotional tendencies.³ My own emphasis has been on the fact that a given tendency, e.g., sympathy, may only be roused in Child *A* by certain situations *X* and *Y*, while Child *B* may be impervious to *X* and *Y* but sensitive to *Z*. It still remains possible that this tendency's own strength, whenever it is roused, may depend partly on Burt's general emotional factor *e*.

Burt himself indeed points out that "All subdivisions of human instincts are more or less arbitrary, and are to be followed for their practical utility alone. Thus, what for certain purposes may be usefully

¹ Dr. BRIDGES points out in her book (p. 40) that various of her detailed record items (e.g., the child (*a*) has (or has not) played with another child, (*b*) has (or has not) joined a group in play, (*c*) always gives up toys at fair request), can be gathered together as showing the development of "sociability" and "co-operation." Possibly some observers, and especially those in nursery schools and with little psychological training, would find this type of approach the more suitable.

² THORNDIKE proceeds much further in analysis and ends with many elementary tendencies. But I agree with Professor Burt that certain groups of them can conveniently be regarded as different manifestations of the same tendency.

In my own list in the report form, curiosity is not included as it seems to me so predominantly intellectual and normally unaccompanied by genuine emotion.

³ First suggested, I think, in his paper to the British Association in 1915. See also *The Subnormal Mind*, p. 50.

spoken of as a single or unitary instinct—such as sex, anger, curiosity, or fear—resolves itself, on narrower scrutiny, into a miscellaneous bundle of several subordinate impulses, each more or less independent.’¹ The point I wish to stress is that the particular type of stimulus which calls forth a reaction may differ in different individuals and that these differences may be important for the study of the present and future development of the individual.

IV.—NOTES ON THE USE OF THE REPORT FORMS.

In order to provide for a more complete report on the whole child and his environment, and especially for a more thorough study of difficult and abnormal children, sections have been added in the report form for notes on the school work,² on neurotic symptoms and peculiar personal habits, and on home circumstances. Of course, it is not necessary that all these points should be noted, or even all the sections on details of temperament traits completed, before the records can be of value. Indeed, a definite combination of only two or three well-established facts may sometimes be of some interest and importance: for example, that a boy may be both very aggressive and yet generous; or in revolt against all in authority and yet keenly sympathetic with the troubles of a younger child.

In the main section on temperament no rigid system of arrangement has been followed. Generally those traits which should be studied in conjunction are placed together, but occasionally two sections which tend to overlap are deliberately separated to encourage a new and independent approach.

When a group of children are to be observed it is better to assess one or two items for all or most of the children rather than assess one child first for all items. This helps to keep the standard more stable and lessens the so-called ‘halo’ effect in marking any child. (This is shown, for example, when an observer having noted that a child is ‘good’ in certain respects, tends to regard him as ‘good’ in general and so gives him good marks for other traits not carefully observed.) In the report form I have also asked for specific instances of behaviour as evidence, a further check upon the ‘halo’ effects.

When most of the group have been marked for one or two items in this way, the report on the first few children marked should be reconsidered in the light of the general standard. Often, of course, it may be advisable for a teacher to mark at once some particular trait of some child on which he has recently had decided evidence.

¹ *The Young Delinquent*, p. 426.

² The bearing of temperamental defects on school work is admirably expounded in Cyril Burt's book, *The Backward Child*, Chap. XV.

When each trait is being reported on the observer should consider the following points : (a) the *sensitivity* of the child's tendency to respond to a stimulus—e.g., not requiring much opposition to rouse anger ; (b) the *frequency* with which the tendency is roused, but with due consideration to the frequency of the situation which might cause it, for in a class of children half of whom are young 'toughs' of his own age, an aggressive boy would probably have his anger roused more often than if he were among a gentle submissive set. Perhaps a better term here would be *invariability* ; (c) the *intensity*, and (d) the *duration* of the apparent reaction ; and (e) the presence of subsequent *after-effects*. A trait should be very extreme as to intensity and sensitivity, and also should be almost 'invariable,' to be marked *A*.¹

In a large and unselected group of children, say 100 children in an infant school, we should expect about half to be marked *C* in a given trait. Of the rest, not more than about five should be in Group *A* and five in Group *E*, leaving about twenty each for *B* and *D* marks. Of course, these proportions may not hold for a given class of thirty, say ; for example, in a nursery school there may be a tendency for the more troublesome children to be brought by their parents.

To bring out the effects of school life, or of any new environment, it is desirable that the first records should be made as soon after the change as the teacher feels he knows the child well enough to mark them reliably. The later records can be made after a period of some months or a year.

If teachers or lecturers in training colleges gather material by means of these report forms and would care to forward them to me, I should be glad to attempt some report on the results combined with those of my own teacher-students. We cannot build up norms thus from independent sources ; but there are, as pointed out in Section 1, several things on which evidence may be gathered. It will be of special interest if teachers can report on decided changes in the children after evacuation and the entry into a new social milieu. Will teachers or lecturers forwarding reports please state if they wish their names to be withheld : otherwise I should like to give their names. Neither the names or initials of the children will, of course, be given.

¹ These five aspects are taken from Cyril Burt's paper in *The Report of the British Association*, 1915, except that I have substituted the term 'sensitivity' for his 'promptitude' and suggest 'invariability' for 'frequency.' The latter would be appropriate for Burt's method but not for the present report form.

I am most grateful to my colleague, Mrs. F. M. Austin, for some valuable suggestions about the Report Form. My warm thanks are also due to Professor Burt who kindly read this paper and Report Form in proof, and made a number of exceedingly helpful comments and suggestions.

REPORT FORM ON TEMPERAMENT AND SOCIAL BEHAVIOUR.

<i>Name.</i>	<i>Date.</i>	<i>Sex.</i>	<i>Age.</i>	<i>Length of Time in School.</i>	<i>I.Q.</i>
	Of 1st Record.				
	Of 2nd Record.				

The first records should be entered in black ink, the second records after the lapse of at least some months or a year may then be entered in red ink, adding dates. Notice especially any decided changes after evacuation if this has taken place.

Try to assess most of the children for one or two items and traits within a short period in order to keep the same standard, rather than assessing one child first for most traits and then going on to a second child. Beware of giving a child a "good" mark in all traits because you know him to be "good" in some.

<i>Physique.</i>		<i>Medical Report.</i>
<i>General.</i>	<i>Special Defects.</i>	

Report on Work in School. Refer especially to *attitude* to work as reported by different teachers.

Special Reports on Progress in Particular Subjects.

PRELIMINARY GENERAL OBSERVATIONS ON BEHAVIOUR AT SCHOOL.

Most Striking Qualities or Characteristic Types of Behaviour.

Several may be given under this heading, underlining those which are very marked. Suggested terms: Co-operative, friendly, popular, aggressive, dominating, taking the lead, submissive, timorous, indifferent (keeping aloof), sympathetic, protective, excitable, placid, cheerful, morose, obedient, conscientious, impulsive. Details of behaviour or particular circumstances should be added, including any difference in behaviour towards children of different ages (younger, older, of same age as self), of the opposite sex, or towards own brother or sister.

Characteristic type of behaviour towards :

Teacher (a)

Teacher (b)

Teacher (c)

Characteristic type of behaviour towards strangers or occasional visitors to school

Characteristic type of behaviour : (a) in games

(b) at meals

(c) at sleeping time

Favourite leisure occupation or game.....

Any part of school routine strongly disliked or resented.....

State length of time child has been under your observation, and what have been your opportunities for observation :

NOTE.—Some items, especially in the last two sections of this report, can hardly be reported except by teachers who get to know the parents and something of the life of the home.

DETAILS OF TEMPERAMENT TRAITS.

Marks should be assigned on each tendency according to the following scale :

A.	B.	C.	D.	E.
Exceptionally strong and frequent	Strong and frequent.	Moderate or average.	Weak or slight.	Very rare and exceptional, or quite absent

C should be taken as the mark of the largest group, among normal children—about half the suggested meanings of the extremes A and E are given in each case below.

Put a cross under the appropriate letter.

If it is uncertain under which of two it should be marked a cross should be put under both. Leave blanks when you feel you have inadequate evidence. Put a circle round a cross if you are especially confident of the mark. Make a separate entry for each age group, (a), (b) and (c), when the behaviour is different towards a member of the opposite sex, or towards own brother or sister. Under *Evidence* give in each case typical examples of the behaviour on which you base your assessment ; additional evidence can be added on a loose sheet.

Significance of A Mark.						Significance of E Mark.
General Sociability.	A.	B.	C.	D.	E.	
Always playing with others and going out with others at all times (this not confined to a relative or one or two friends).						Nearly always keeps aloof from others (even when only one or two), except perhaps from brother and sister.

Note if this is largely confined to (a) children of about the same age, or (b) younger children.

Evidence :

Individual Friendliness.	A.	B.	C.	D.	E.	
Constantly associating with one or two particular friends only. Give separate marks if this is chiefly with, or varies greatly with : (a) Brother						Having no particular associates though may be friendly with many.
(b) Sister						
(c) Some adult						
(d) A child younger than self						

Evidence :

Of (a)

Of (b)

Of (c)

Of (d)

Gregariousness.	A.	B.	C.	D.	E.	
A constant tendency to join a group or gang. Not content with being with one at a time.						Avoids a group ; social life confined as far as possible to one or two others at a time.

Evidence :

Sympathy (merely passive).	A.	B.	C.	D.	E.
(1) <i>With pain:</i> Shows great sympathetic distress (though does nothing to help) when the suffering child is : (a) Of similar age. (b) Younger. (c) Older.					
					Even great pain in the presence of distress brings no sign of distress in the suffering child is : (a) Of similar age. (b) Younger. (c) Older.

Evidence :

As to (a)

As to (b)

As to (c)

	A.	B.	C.	D.	E.
(2) <i>With distress or unhappiness:</i> Keenly distressed when another child is seen to be, if distressed child is : (a) Of similar age. (b) Younger. (c) Older.					
					Remains quite cheerful in presence of distress, when other child is : (a) Of similar age. (b) Younger. (c) Older.

Evidence :

As to (a)

As to (b)

As to (c)

	A.	B.	C.	D.	E.
(3) <i>With happiness:</i> Readily shows signs of joy when another child is pleased: when the other child is : (a) Of similar age. (b) Younger. (c) Older.					
					Makes no sympathetic response to child who expresses great happiness, when that child is : (a) Of similar age. (b) Younger. (c) Older.

Evidence :

As to (a)

As to (b)

As to (c)

Protective Impulse or Active Sympathy.

- (1) *Towards one in physical pain.* Makes immediate and strong efforts to comfort or to remove cause of pain, when other child is :
 (a) Of similar age.
 (b) Younger.
 (c) Older.

Makes no attempt to help or comfort another in pain, when other child is :

- (a) Of similar age.
 (b) Younger.
 (c) Older

Evidence :

As to (a)

As to (b)

As to (c)

- (2) *Towards one in distress or unhappiness:* Makes great and continued efforts to relieve and comfort, even at considerable self-sacrifice, when other child is :
 (a) Of similar age.
 (b) Younger.
 (c) Older.

Makes no attempt to comfort or help those in even great distress, when other child is :

- (a) Of similar age.
 (b) Younger.
 (c) Older.

Evidence :

As to (a)

As to (b)

As to (c)

- (3) *Towards one in difficulty :*

Constantly helps other children in difficulties (though they show no sign of distress) when other child is :

- (a) Of similar age.
 (b) Younger.
 (c) Older.

Never tries to help even children in great difficulty, when other child is :

- (a) Of similar age.
 (b) Younger.
 (c) Older.

Evidence :

As to (a)

As to (b)

As to (c)

(4) *Towards one in danger through aggression of others :*

Enters vigorously into active defence if a child is being harassed or bullied or unjustly treated by others : when child is :

- (a) Of similar age.
(b) Younger.
(c) Older.

A.	B.	C.	D.	E.

Refuses to help even if appealed to by a child who is cruelly treated by another When child is :

- (a) Of similar age.
(b) Younger.
(c) Older.

Evidence :

As to (a)

As to (b)

As to (c)

<i>Unselfishness.</i>	A.	B.	C.	D.	E.	
Readily gives up toys or privileges to others, shares sweets, etc., with :						Grasping and greedy. Rarely shares his property with :
(a) Children of similar age.						(a) Children of similar age.
(b) Younger children.						(b) Younger children.

Evidence :

As to (a)

As to (b)

<i>Assertiveness.</i>	A.	B.	C.	D.	E.	
(1) Constantly tries to take the lead and to dominate other children :						(1) Never interferes with others, or insists on own way with children :
(a) Of similar age.						(a) Of similar age.
(b) Younger than self.						(b) Younger than self.
(c) Older than self.						(c) Older than self.
(2) Special tendency to contradict. (Add note if this is confined to one type of person.)						(2) Very rarely contradicts.
(3) Very noisy : bangs about and shouts.						(3) Very quiet and unobtrusive

Evidence :

As to (1) (a)

As to (1) (b)

As to (1) (c)

As to (2)

As to (3)

<i>Taking the initiative without domination.</i>	A.	B.	C.	D.	E.	
Always originating his own activities (which may be followed by others, but without an attempt to dominate them).						Shows no initiative in his own affairs; waits for suggestions or just imitates others.

Evidence :

<i>Dependence of an emotional type.</i>	A.	B.	C.	D.	E.	
Very dependent on presence and encouragement of mother or other trusted person. Wants to be with them constantly.						Very independent; likes to "look after himself."

Evidence :

<i>Aggressiveness and Pugnacity.</i>	A.	B.	C.	D.	E.	
Rough, constantly quarrelsome, bullies or fights (a) Children of similar age. (b) Younger children. (c) Older children.						Never fights even in self-defence. Submits to domineering by (a) Children of similar age. (b) Younger children. (c) Older children.

Evidence :

As to (a)

As to (b)

As to (c)

<i>Destruction of Property.</i>	A.	B.	C.	D.	E.	
Wantonly destroys things : (a) His own. (b) Other people's.						Carefully avoids injuring things belonging to : (a) Himself. (b) Others.

Evidence :

As to (a)

As to (b)

<i>Temper.</i>	<i>A.</i>	<i>B.</i>	<i>C.</i>	<i>D.</i>	<i>E.</i>	
(1) Outbursts of anger frequent and violent: (state usual causes)						Practically never even annoyed. Always sweet tempered even under provocation.

Evidence :

.....

.....

	<i>A.</i>	<i>B.</i>	<i>C.</i>	<i>D.</i>	<i>E.</i>	
(2) Prolonged sulks: (state usual causes)						Never sulks, though occasional outbursts of temper may occur.

Evidence :

.....

.....

<i>Submissiveness.</i>	<i>A.</i>	<i>B.</i>	<i>C.</i>	<i>D.</i>	<i>E.</i>	
(1) Towards the teacher. Very obedient, accepts practically all suggestions of teacher (a) teacher (b) teacher (c)						Very resistive to suggestion. Needs pressure to obey teacher (a) teacher (b) teacher (c)

Evidence :

As to (a)

.....

As to (b)

.....

As to (c)

.....

	<i>A.</i>	<i>B.</i>	<i>C.</i>	<i>D.</i>	<i>E.</i>	
(2) Towards other children. Invariably allows himself to be dominated by other children : (a) Of similar age. (b) Younger than self. (c) Older than self.						Very rarely falls in with suggestions and ideas of other children : (a) Of similar age. (b) Younger than self. (c) Older than self.

Evidence :

As to (a)

.....

As to (b)

.....

As to (c)

.....

(3) Invariably obedient to :

(a) Father.

(b) Mother.

A.	B.	C.	D.	E.

Very disobedient and defiant to

(a) Father.

(b) Mother.

Evidence :

As to (a)

As to (b)

Sensitivity to Criticism.

Seems cowed and distressed by even mild reproof or criticism.

A.	B.	C.	D.	E.

"Tough skinned," seems impervious to criticism; untroubled even when other children poke fun at him.

Evidence :

Self-Display.

Constantly "showing off"

(a) Among other children.

(b) To adults.

A.	B.	C.	D.	E.

Very retiring, unobtrusive, shy:

(a) Among other children.

(b) With adults.

Evidence :

As to (a)

As to (b)

Conceit and Self-satisfaction.

Very conceited even if does not try to show off.

A.	B.	C.	D.	E.

Extremely modest : no signs of self-satisfaction.

Evidence :

Affection.

Very affectionate and demonstrative towards many other children :

(a) Of similar age.

(b) Younger children.

(c) Older children.

A.	B.	C.	D.	E.

Shows no fondness for :

(a) Children of similar age.

(b) Younger children.

(c) Older children.

Evidence :

As to (a)

As to (b)

As to (c)

<i>Likeability.</i>	<i>A.</i>	<i>B.</i>	<i>C.</i>	<i>D.</i>	<i>E.</i>	
Very popular with many others. (Note if this refers especially to any age groups.) Much sought after for play or company. Give reasons for any extremes if possible.						Avoided and apparently disliked by practically all children, except, perhaps, brother or sister.

Evidence :

.....

.....

<i>Jealousy.</i>	<i>A.</i>	<i>B.</i>	<i>C.</i>	<i>D.</i>	<i>E.</i>	
Shows great resentment if affection shown to other children (even if no greater than affection shown to itself). (a) By teacher. (b) By other children.						Apparently entirely unaffected by warm demonstration of affection to other children: (a) By teacher. (b) By other children.

Evidence :

As to (a)

.....

As to (b)

.....

<i>Cheerfulness.</i>	<i>A.</i>	<i>B.</i>	<i>C.</i>	<i>D.</i>	<i>E.</i>	
Invariably very cheerful—much smiling and laughter. (Note special occasions.)						Rarely laughs : usually very solemn or morose. (Note exceptional occasions.)

Evidence :

.....

.....

<i>Stability of Temperament.</i>	<i>A.</i>	<i>B.</i>	<i>C.</i>	<i>D.</i>	<i>E.</i>	
Very stable—not easily upset or suddenly joyful. No rapid or excessive changes of mood, whether joy or sorrow.						Very changeable and excitable. Moves from one extreme to another. Impulsive.

Evidence :

.....

.....

<i>Persistency in Activities.</i>	<i>A.</i>	<i>B.</i>	<i>C.</i>	<i>D.</i>	<i>E.</i>	
Very rarely gets discouraged : continues to wrestle with difficult tasks : constantly returns to make new attempts.						Quickly gives up if success not achieved at once, even in activities of his own choice.

Evidence :

.....

.....

<i>Talkativeness.</i>	<i>A.</i>	<i>B.</i>	<i>C.</i>	<i>D.</i>	<i>E.</i>	
Always chattering.						Very silent—hardly ever talks spontaneously.

Evidence :

.....

.....

<i>Specific Fears.</i>	<i>A.</i>	<i>B.</i>	<i>C.</i>	<i>D.</i>	<i>E.</i>	
(1) Of persons. Often very afraid of :						Bold with others—no trace of nervousness with :
(a) Other children.						(a) Other children.
(b) Strangers.						(b) Strangers.
(c) Some particular individual.						(c) Any particular person.

Evidence :

As to (a)

.....

As to (b)

.....

As to (c)

.....

	<i>A.</i>	<i>B.</i>	<i>C.</i>	<i>D.</i>	<i>E.</i>	
(2) Of situations or things. Intensely alarmed by :						Extremely fearless :
(a) Certain animals.						(a) Will approach any strange animal.
(b) Sudden noises.						(b) Never starts at loud noises.
(c) The dark.						(c) Not the slightest fear of the dark.
Add any further specific fears.						

Evidence :

As to (a)

.....

As to (b)

.....

As to (c)

.....

<i>Courage and Daring.</i>	<i>A.</i>	<i>B.</i>	<i>C.</i>	<i>D.</i>	<i>E.</i>	
Does venturesome things or faces pain with courage (even if some fear is apparently also felt).						Never venturesome ; shrinks from all physical risks.

Evidence :

.....

.....

<i>Acquisitiveness.</i>	A.	B.	C.	D.	E.
Tries to obtain for himself and to keep all sorts of desirable things—e.g., takes toys, etc., from other children. Keeps a firm hold on his own possessions.					
					Indifferent to gaining possession of things or keeping his own things. Constantly giving things away.

Evidence :

<i>Imitation.</i>	A.	B.	C.	D.	E.
Whether apparently deliberate or unconscious.					
(1) Of Actions : Constantly imitating actions :					
(a) Of teachers.					
(b) Of other children.					
					Rarely imitating even when a group of other children are imitating actions : (a) Of teachers. (b) Of other children.

Evidence :

As to (a)

As to (b)

	A.	B.	C.	D.	E.
(2) Of Speech. Constantly imitating mode of speech, or echoing actual words :					
(a) Of teachers.					
(b) Of other children.					
					Never imitating special mode of speech or repeating actual words : (a) Of teachers. (b) Of other children

Evidence :

As to (a)

As to (b)

<i>Disgust.</i>	A.	B.	C.	D.	E.
Shows great disgust at :					
(a) Slight uncleanness.					
(b) Some foods accepted by most children.					
(c) Mere reference to disgusting things, e.g., being sick.					
					Shows no disgust even at : (a) Very offensive uncleanness. (b) Very unpleasant looking or bad smelling food. (c) Sight of another vomiting.

Evidence :

As to (a)

As to (b)

As to (c)

" PROBLEM " TRAITS OR NEUROTIC SYMPTOMS (additional to some comprised by extreme degrees of certain traits given above), seen at any time in school career or reliably reported :

State if any change has taken place and under what circumstances.

Revolt against authority of : Teacher.....

Father

Mother

Truancy

Running Away

Lying : (a) When in a " fix ".....

(b) Constantly and with little motive for it.....

Cruelty : Apparently enjoyed, without motive of revenge.....

Stealing : (a) From other children.....

(b) School or public property

Excessive Fatiguability

Extreme Laziness.....

Hysterical Outbursts

Compulsive Repeated Actions

Other Obsessions

Incontinence

Masturbation

Signs of Excessive Sex Development.....

PERSONAL PECULIARITIES : seen at any time in school career. State if any change has taken place and under what circumstances :

Mannerisms

Tics

" Fads," about food, etc.

Finger Biting, Thumb Sucking (after two years of age).....

Personal Uncleanliness or Antipathy to Washing

HOME CIRCUMSTANCES.

Are both Parents living together in the home?.....

Occupation of: Father.....

Mother

Any signs of extreme poverty?.....

Evidence of Affection: (a) of Mother towards Child

(b) of Father towards Child

Discipline of this child in home: (a) by Mother

(b) by Father

(c) by other Relatives

Any sign of difference between (a), (b) or (c)?.....

Place of child in family: 1st, 2nd } child among.....
3rd, 4th }

Evidence of lack of wisdom in bringing up of child.....

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THE EFFICIENCY OF DIFFERENT METHODS OF MARKING ENGLISH COMPOSITION.

By B. M. D. CAST

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PART II.

V.—*Factor analysis.*

VI.—*Types among examiners.*

VII.—*Types among examinees.*

VIII.—*Conclusions and summary.*

V.—FACTOR ANALYSIS.

IN the first part of this paper I described the results of investigating the efficiency of examiners, and of different modes of marking, first by the time-honoured method of calculating averages and standard deviations, and, secondly, by the newer and more precise method known as 'analysis of variance.' I now propose to describe the results of a third method of analysis, namely, correlating the marks by persons and factorizing the results according to what is sometimes known as 'P-technique.' This, of course, is not the first time these two more specialized procedures have been used in studying the causes of individual variation among examiners or among examinees. In the past, however, they have usually been applied to actual examination marks. This entails two disadvantages: first, the ordinary examination is a practical affair, and hence actual marks are not wholly suited for a theoretical analysis; secondly, any report on the results, implying as it inevitably must criticisms of the less efficient examiners or the less efficient aspects of the examinations, is too confidential a document for general publication.

The data to be examined here, it will be remembered, were obtained from an artificial examination undertaken for the express purpose of this research. The method of analysis now to be described was applied to the same data as before, namely, marks allotted to forty English compositions by twelve examiners according to four methods of marking. The chief questions on which, it is claimed, 'P-technique' may throw some light are the following: (1) Is there a general factor (the 'true marks') influencing all the examiners in varying degrees, and, if so, which examiner and which mode of marking yield the best approach to it?

(2) Are there different 'types' among examiners, one perhaps working best with one mode of marking, and another with another? (3) Are there different 'types' among the examinees, one set of candidates perhaps excelling most in one aspect of composition and another in another?

As a means of attacking such problems as the present, the method of "correlating persons," and seeking "factors" to explain the resulting coefficients has been in occasional use for many years, though the number of investigators who have systematically employed the method is astonishingly small. The set of correlations so obtained really amounts to a table of reliability or consistency coefficients.¹

In the report already cited, Burt worked out all the possible correlations between all the mark-lists, eliminated the 'general factor,' and then treated each square submatrix, giving correlations between the different examiners' mark-lists for a single method, as indicative of a positive group-factor for that method. Owing to the fact that his data, which were marks from actual examinations, had not been allotted with the requirements of a formal statistical analysis in view, the results thus reached were admittedly neither clear nor conclusive: but the somewhat elaborate procedure seemed the only procedure possible because the examiners did not all use the same methods. In my own experiment, the same four methods were used by the same twelve examiners throughout. Hence it will be sufficient for our purpose to examine simply the intercorrelations for each of the four methods separately.

With the present data we thus have four 12×12 tables of inter-correlations to examine. To save space I shall not print the tables in full. It will be sufficient to give only one table in illustration (Table VI); the remainder will be found in the thesis already cited. It will be seen at once that the table presents an approximately hierarchical arrangement, though there are several striking divergences suggesting at least a second factor. The average correlations for all the tables are shown in the first column of Table VII.

¹ An examination of the "central factors" underlying such "consistency coefficients" was first attempted by Burt in studying correlations between persons (both examiners and examinees) with the Binet-Simon scale, and was later employed in selecting and standardizing tests of "qualitative" school subjects, particularly drawing and composition (*Mental and Scholastic Tests*, 1921, p. 137; cf. Burt and Bickersteth, "Results of Mental and Scholastic Testing," *Report Conf. Educ. Ass.*, 1916, p. 30). Later, Thomson and Bailes ("Reliability of Essay Marks," this *Journal*, IV, 1926, pp. 85-91), without explicitly discussing the existence of a central factor, gave what are virtually an approximate form of saturation-coefficients, namely, correlations of each examiner with the totals of the rest. In one experiment, where (it appears) Burt's procedure was followed, the average saturation was .755; in another it was .751. These figures are of much the same order as those obtained here. It is interesting to note that, when the marks were awarded by inexperienced students, the figure fell to .628.

Dr. Rhodes, it may be remembered, and Stephenson in his earlier comments, doubted the validity of correlating persons altogether. A full discussion of the problem will be found in Thomson's book (*loc. cit. sup.*, pp. 199, *et seq.*). For Rhodes' procedure see *Marks of Examiners*, pp. 83, 179f., and 275.

TABLE VI.
ANALYTIC METHOD. CORRELATIONS BETWEEN EXAMINERS.

Examiner.	L	E	D	M	A	H	B	J	C	G	F	K	Average.
L	—	.779	.638	.739	.561	.665	.689	.607	.539	.538	.442	.365	.597
E	.779	—	.659	.694	.660	.773	.764	.460	.441	.503	.444	.171	.590
D	.638	.659	—	.630	.770	.508	.604	.580	.668	.544	.384	.316	.573
M	.739	.694	.630	—	.482	.595	.602	.456	.557	.505	.525	.433	.565
A	.561	.660	.770	.482	—	.617	.537	.525	.580	.530	.266	.284	.529
H	.665	.773	.508	.595	.617	—	.713	.417	.409	.461	.381	.102	.513
B	.689	.764	.604	.602	.537	.713	—	.351	.492	.435	.424	.009	.511
J	.607	.460	.580	.456	.525	.417	.351	—	.542	.398	.523	.298	.469
C	.539	.441	.668	.557	.580	.409	.492	.542	—	.371	.274	.268	.467
G	.538	.503	.544	.505	.530	.461	.435	.398	.371	—	.329	.331	.450
F	.442	.444	.384	.525	.266	.381	.424	.523	.274	.329	—	.290	.389
K	.365	.171	.316	.433	.284	.102	.009	.298	.268	.333	.290	—	.261
Sat. Coeffs.													
1st Factor	.868	.836	.829	.817	.757	.733	.730	.664	.662	.634	.543	.355	
2nd Factor	.139	.283	—	.273	.035	—	.148	.305	.307	.105	—	.205	—

It will be noted that the amount of general agreement is decidedly poor. The average correlation (barely .50) is far lower than the usual reliability coefficient obtained with standardized tests of intelligence or of elementary school subjects. On the other hand, it is, if anything, a little higher than those cited by most previous investigators who have compared the markings of two or more teachers judging children's compositions in the ordinary way. The range of correlation is very great: with the Analytic method, K, who seems throughout one of the least reliable of the examiners, has practically zero correlation with the marks of B; L, on the other hand, who is throughout one of the most reliable, has a correlation of nearly .8 with E.

The four correlation tables obtained with the four methods have been factorized separately. The method employed was Burt's summation method: the results so obtained were checked by table-by-column multiplication (the so-called least squares method). Four factors were extracted. The saturation coefficients for the first two are shown in Table VIII below.

The last two columns of Table VII indicate, for each of the four correlation tables, the amount of variance contributed by the first two factors respectively. It will be seen that, on an average, the first factor accounts for almost exactly 50 per cent, and the second for just over 7 per cent: these figures tally with the percentages usually found with unselected groups.¹ The symmetry criterion proves that the factors

¹ Cf. BURT: *Character and Personality*, VII, iv, p. 289; DAVIS: *Brit. Jour. Psych.*, XXIX, iv, p. 412.

underlying three of the four tables are very much the same : even the fourth table—that for the Achievement method—does not stand far away from the others ; but a closer study shows that here the resemblances are due mainly to the general factor.

The first or "general factor" is the factor responsible for the agreement or consistency which the examiners show amongst themselves. Hence to compare the amount of consistency produced by the four different methods of marking, the most accurate procedure will be to inquire to what extent the general factor contributes to the total variance in each case. From the second column of Table VII it will be seen that the Analytic method produces the greatest amount of agreement among the twelve examiners ; the method of General Impression is nearly as good ; the Individual methods, as might be anticipated, show a somewhat smaller degree of consistency ; the Achievement method here appears as the poorest of the four. The differences are not large. But it will be observed that the order of superiority given by this criterion is the same as that given by the Analysis of Variance when V_c/V_f —i.e., success in differentiating the writers—is taken as the criterion.¹

TABLE VII.

AVERAGE CORRELATION BETWEEN EXAMINERS AND AMOUNT OF VARIANCE CONTRIBUTED BY THE FIRST AND SECOND FACTORS.

	<i>Average Correlation.</i>	<i>First Factor.</i>	<i>Second Factor.</i>
Individual Method	·479	49·7%	8·5%
Achievement Method	·439	46·4%	10·2%
General Impression	·485	50·7%	4·6%
Analytic	·492	51·2%	5·0%
Average	·474	49·5%	7·1%

¹ The relation between the two methods is commonly indicated by stating that, with one criterion of classification only, the analysis of variance is equivalent to starting with the "intra-class" correlations. The usual method of correlating persons works with ordinary, i.e., with "inter-class" correlations. Intra-class correlation treats the distinctions between the examiners awarding the marks as irrelevant : they are calculated as though we had omitted to record the names of the examiners awarding each mark and only kept the name of the candidate receiving them. As usual, the proportional amount of variance contributed by the first factor is but little larger than the average correlation.

After eliminating the first factor, comparatively few of the residuals are statistically significant according to the usual criterion, but they point to the probable existence of a second factor. On eliminating the second factor no significant residuals were found.

VI.—TYPES AMONG EXAMINERS.

The second factor is bipolar, and suggests that in each case the examiners may be grouped into two antithetical types, members of either type agreeing specifically with each other, but disagreeing with those of the opposite type. One type thus receives positive saturation coefficients and the other negative. Owing to the small number of examinees dealt with, the figures for the second factor are bound to have but low statistical significance : any deductions from them must therefore be regarded as suggestive only, not conclusive.

The figures themselves (Table VIII) clearly indicate that, with three out of the four methods of marking, the same examiner would be allotted to much the same types. The Achievement method, in this as in other respects, yields different results from the other three ; but hardly any of its residuals are fully significant.

To interpret these types we have three lines of evidence : first, each examiner has been asked to state what method he naturally used ; secondly, each has been asked to state which of the new methods he prefers ; thirdly, we can correlate the marks for each with the grand totals awarded to the essays by all the examiners with each of the methods, and so determine which of the new methods actually produces the most accurate results in the hands of this examiner or that as judged by this criterion. We find that those who have *positive* saturations either (a) naturally use an analytic method, or (b) actually did better with an analytic method when it was imposed upon them. Those who have *negative* saturations relied almost exclusively upon broad impressions for their marking : a few indeed say they gave so many marks for subject matter and so many for style or technique (a "twofold analysis only," as one of them calls it) : and several enumerate the chief points which influenced them ; but none of them appear to have followed any detailed or systematic scheme. As for preferences, it is instructive to note that these are by no means a safe guide to efficiency : some of those with a positive saturation strongly disliked the labour entailed by learning and applying the new analytic method, yet nevertheless did much better with it than with their own.

TABLE VIII.—SATURATION COEFFICIENTS FOR EXAMINERS

Examiner.	FIRST FACTOR.			SECOND FACTOR.				Comments.
	Analytic.	General Impression.	Individual.	Achievement.	Analytic.	General Impression.	Individual.	
B	.730	.616	.733	.683	.307	.673	— .023	Did better with Anal.; Prelim. grouping.
H	.733	.746	.744	.831	.305	.307	.020	Did better with Anal. Detailed analysis.
E	.836	.717	.811	.785	.283	.304	.017	Four readings: mental analysis.
L	.868	.885	.853	.839	.139	.072	.210	Prelim. grouping; broad anal.; disliked Anal.
J	.664	.667	.527	.568	.105	.154	.674	Did better with Anal.; Imp. for subject matter; Anal. for technique.
F	.543	.332	.363	.547	.133	— .359	.249	Did better with Anal.; Imp. for subject matter; Anal. for technique.
M	.817	.780	.813	.737	.035	.260	— .380	Broad analysis.
G	.634	.822	.644	.583	— .110	— .021	— .218	Prelim. grouping by Imp.; and threefold analysis. Disliked Anal.
A	.757	.872	.760	.830	— .148	— .183	— .131	Prelim. grouping by Imp.; Analysis on third reading.
C	.662	.698	.718	.520	— .205	— .082	— .335	General Imp.; twofold analysis.
D	.829	.684	.627	.670	— .273	— .542	— .284	Almost pure Geo. Imp. with no Detailed Anal.
K	.355	.554	.716	.429	— .358	— .200	.257	General Imp.; Detailed Analysis.

It is interesting to speculate on the origins of these differences. In part they are not psychological at all: one examiner reports that he learnt his method (a simple form of the analytic procedure) from instructions prescribed for the junior county scholarship examination; other examiners, who have frequently had a large number of papers to mark in a limited amount of time, have been forced to adopt the speedier method of general impression. But, after making full allowance for these accidental influences, it would seem, as Burt has suggested, that in many cases the two tendencies are special instances of a general or temperamental bias towards what he terms an "analytic" or an "intuitive" approach. In judging a complex pattern of relations, the general quality of the pattern can be recognized either by "explicitly analysing it into its component parts and distinctly formulating their relations" or "by a complex synthetic activity whereby we implicitly comprehend the essential character of the whole without such explicit analysis";¹ and apparently some minds incline naturally towards one procedure, others towards the opposite.

There is another way in which a correlational analysis may elucidate the problems of examining. Burt and Pelling have shown that correlations of repeated markings or rankings *by the one and same judge* will throw much light on the personal peculiarities and prejudices of the persons judging. Their investigations were concerned primarily with æsthetic judgments; but a subsidiary study carried out in connection with the present research leads to much the same conclusions as regards examiners. First of all, if the repetitions are continued long enough, the correlations between the successive ranks gradually rise, and ultimately touch unity. A correlation of unity implies that the examiner has at last settled down to a fixed and stable order which he apparently remembers perfectly. With different individuals this final result requires a different number of repetitions; and two types seem distinguishable: with the self-confident it is usually attained very rapidly; with the more unstable and with those who have less faith in their own judgment, it may never be attained at all. It is thus no mere effect of memory. Space, however, will not allow me to discuss these interesting side-issues further here.

VII.—TYPES AMONG EXAMINEES.

The technique of correlating persons may be applied not only to the correlation of *examiners*, but also to the correlation of *examinees*. The data supplied by the mark schedules used in the analytic method prove highly instructive when studied in this way. In the schedules as they stand the marks for the different items are weighted according to their assumed importance. Accordingly, to reduce them to comparable terms it is necessary first of all to express them as multiples of their own standard deviation. The marks awarded to each of the forty candidates for each separate item can then be correlated, every child being paired in turn against every other. The correlations thus obtained tell us how far the pattern of marks obtained by one candidate resembles that obtained by another. The table of coefficients is too large to print,

¹ BURT: *Jour. Exp. Ped.*, I, 1911, p. 101.

but will be found in my thesis. It forms a bipolar hierarchy; and, on being factorized, yields one significant factor only. The saturation coefficients are shown in the first column of Table IX. They separate the children into two antithetical groups or types. What, then, is the nature of this factor and these types?

TABLE IX.
MARKS FOR DIFFERENT ASPECTS OF ENGLISH COMPOSITION.

<i>Candidate No.</i>	<i>Saturation Co-efficients.</i>	<i>Style.</i>	<i>Vocabulary.</i>	<i>Information.</i>	<i>Logical Arrangement.</i>	<i>Mechanical Accuracy.</i>
8	.52	1.09	.19	.95	.39	—2.61
5	.46	1.26	.34	.25	.25	—2.11
15	.41	.56	.09	.40	.53	—1.57
20	.39	.63	— .02	.32	.54	—1.46
19	.37	.80	.38	— .01	— .33	— .83
25	.33	.41	.10	.18	— .13	— .58
40	.30	.40	.85	.21	— .79	— .68
3	.28	.27	.46	— .05	— .20	— .48
1	.28	— .11	.28	.58	.44	—1.19
23	.25	.41	— .29	.34	.30	— .75
4	.25	— .22	— .14	.52	.72	— .87
39	.22	.04	.61	— .16	— .36	— .13
21	.20	— .25	.36	.21	.20	— .53
26	.16	.03	— .06	.19	.27	— .43
24	.13	.31	— .22	.17	.13	— .39
37	.11	.47	— .35	.43	— .20	— .35
32	.09	.55	.19	.21	— .68	— .27
7	.05	.16	.12	— .38	.15	— .05
9	.03	— .31	.28	.16	— .05	— .08
11	.02	— .37	1.31	—1.11	— .05	.21
Average	.23	.31	.22	.17	.06	— .76
12	— .01	.28	— .14	— .93	.51	.29
18	— .03	— .51	.04	.44	— .03	.07
28	— .04	1.38	— .64	— .19	— .93	.38
13	— .06	— .05	.30	— .58	— .10	.43
34	— .09	— .21	— .66	.39	.38	.10
14	— .13	— .19	— .33	.11	.10	.30
27	— .16	— .24	— .01	— .14	— .01	.40
33	— .20	— .32	— .01	— .06	.08	.31
16	— .22	— .45	.02	— .33	.27	.50
6	— .25	— .01	— .22	.25	— .52	.50
36	— .26	— .18	— .45	.18	.04	.40
38	— .28	.02	— .25	— .22	— .25	.70
31	— .28	.13	— .23	— .43	— .34	.87
2	— .30	— .21	— .04	— .37	— .09	.72
22	— .32	— .72	— .33	.22	.07	.77
29	— .35	— .79	.11	— .09	— .07	.84
35	— .37	— .26	— .26	— .46	— .12	1.10
30	— .40	— .42	— .74	— .04	— .26	1.46
17	— .44	— .79	— .52	— .64	— .29	2.24
10	— .49	— .76	— .57	— .92	— .03	2.29
Average	— .23	— .21	— .25	— .19	— .08	.73

In the table I have added for each child the marks for the main "aspects" of English composition under which the items are classified in the schedule. To bring out the strong and weak points of each candidate his marks have first been reduced to deviations about his own average. On the whole, it will be seen that the children who have positive saturation coefficients for the bipolar factor obtain positive marks for the use of literary or stylistic devices, for vocabulary, for knowledge of the subject matter, and even (though there are conspicuous exceptions) for logical arrangement. On the other hand, for the more mechanical aspects of composition—spelling, handwriting, punctuation, paragraphing, grammar, and syntax—they obtain, with only one or two minor exceptions, negative marks. Those who obtain negative saturation coefficients show the opposite characteristics.

A first-hand study of the children themselves suggests that the differences thus indicated are by no means accidental or temporary but often related to their individual temperament.¹ Thus those with positive saturations include the more unstable or extraverted children; those with negative saturations are either highly stable or (more commonly) repressed extraverts. The former are imaginative, well informed, fluent writers, usually (though by no means always) fairly logical in arranging their ideas, but decidedly hurried in their writing and careless in their spelling and grammar. The latter are slow and careful writers, with little interest in external subjects as such and comparatively devoid of verbal fluency and elasticity of phrase. We might perhaps call them the *fluent* and the *precise* type respectively.

The dichotomy between the mechanical and the literary or informational aspects of composition, which is thus revealed by correlating persons, is also confirmed by the results of correlating traits (Table X). These correlations, of course, are based on the original marks as entered in the schedule. The approximate saturations have been calculated by the simple summation method. To bring out the relations more clearly, I have separated marks for

¹ All the children tested were known to me personally; but I endeavoured to obtain independent character-sketches from the other mistresses in the school—to whom I take this opportunity of expressing my thanks. The notes of the English mistress often agree in a striking way with the factorial assessments: thus Candidate No. 8, who has the highest positive saturations, is described as "overflowing with ideas, but most inaccurate"; of No. 10, who has the largest negative, she says: "not an idea in her head." Of others who have large negative saturation coefficients she uses such expressions as "A weak pupil, but accurate in mechanical work on the whole" (No. 17), "all her work produced as the result of effort" (No. 16).

Somewhat similar types were apparently noted by Burt in children's compositions, where the subject was a story previously read. "Two antithetical types or tendencies," he writes, "may be discerned. The tendency of the first is to condense, to simplify, to generalize—to give a brief, bald précis of definitely recollected facts, unaltered and unadorned. The tendency of the second is to embellish and elaborate, to rationalize and vivify, to construct a concrete and interesting narrative, with every detail picturesque and every incident explained" (*Mental and Scholastic Tests*, p. 279: for the suggestion that the outstanding characteristics of a person's artistic or literary style may be in part the outcome of his temperamental type, see *ibid.*, footnote 2, and "The Factorial Analysis of Emotional Traits," *Character and Personality*, III, iv, pp. 294, *et seq.*).

certain groups of items, such as spelling, handwriting (with which are included punctuation and paragraphing), grammar (including syntax), which are all classed together in the schedule under the broad heading of "mechanical." It will be seen that there is a general factor producing positive correlations all through, but that the non-mechanical aspects, on the one hand, and the mechanical aspects, on the other, have high positive specific correlations amongst themselves, but negative specific correlations with aspects in the opposite category. The bipolar factor for tests is thus practically identical with the bipolar factor for persons.

TABLE X.

CORRELATIONS BETWEEN MARKS FOR DIFFERENT ASPECTS OF COMPOSITION

<i>Aspect.</i>	<i>Style.</i>	<i>Voc.</i>	<i>Inf.</i>	<i>Log.</i>	<i>Hand.</i>	<i>Gram.</i>	<i>Spell.</i>
Style	—	.873	.817	.853	.207	.163	-.098
Vocabulary .....	.873	—	.785	.844	.088	.202	.353
Information .....	.817	.785	—	.783	.131	.176	.258
Logic .....	.853	.844	.783	—	.172	.321	.314
Handwriting, etc. ....	.207	.088	.131	.172	—	.342	.323
Grammar, etc. ....	.163	.202	.176	.321	.342	—	.679
Spelling, etc.	-.098	.353	.258	.314	.323	.679	—
Saturation { 1st Factor	.814	.856	.773	.908	.307	.517	.612
Coefficients { 2nd ,,	.407	.383	.377	.227	-.301	-.607	-.613

VIII.—CONCLUSIONS AND SUMMARY.

The chief outcome of the inquiry may be summarized as follows :

I.—Forty English compositions were marked by twelve examiners by four different methods : (1) the examiner's own habitual method, whatever it was, (2) the method of general impression, (3) Burt's analytic method, (4) Hartog's achievement method. The data were subjected to a statistical analysis along three main lines :

(A) The *Comparison of Averages and Random Variations* shows that examiners differ widely in their general standards and in the range of marks which they allot to one and the same candidate. This time-honoured method of analysis, however, yields no simple criterion for testing the statistical significance of these differences or solving allied problems.

(B) The *Analysis of Variance* shows (1) that the examiners' standards of severity differ significantly, except where restrictions have been imposed by the instructions ; (2) that the average marks received by the different candidates also differ significantly, i.e., genuine differences are never wholly obscured. Burt's claim that these and similar problems can be studied most satisfactorily by the analysis of variance appears fully substantiated, and the objections to his proposal are easily met.

(C) *The Correlation of Persons (P-technique)*. (1) The correlations between the examiners show (a) a general factor (representing the best approximation to the "true marks") accounting for 50 per cent of the variance; (b) a dichotomous factor dividing examiners into two overlapping types—those who mark better (i) by analytic and (ii) by intuitive or impressionistic methods respectively. (2) The correlations between the examinees show a dichotomous factor tending to divide the writers into (i) the more precise and mechanically accurate, and (ii) the more fluent or informative. With the marks obtained by the analytic method of marking, the correlations between traits yield the same dichotomous factor as the correlations between persons, in addition to the usual general factor.

II.—Of the four methods of marking employed, the "analytic" method (allotting separate marks for specified points or qualities), though laborious and unpopular, appears almost uniformly the best, as judged by each of the criteria. The method of marking by "general impression" discriminates more widely among the individual candidates, but tends to judge them by more superficial characteristics. Judgments based on the examiner's own habitual or preferred procedure are, in general, less reliable than those based on a prescribed and standardized procedure, even though new. Hartog's method appears unsuitable for pupils who have not been taught by it.

As this is in many ways a first and a pioneer study of the problem, it would be unwise to press too strongly the conclusions provisionally reached or to urge any practical recommendations in detail. The main impression which the investigator receives is the great value of systematic studies of examination data, not by one statistical method, but by several. The proposal to apply the "analysis of variance" to these problems certainly seems justified: it is at once practicable, precise, and highly informative. The application of "P-technique" (correlation between persons) also yields information that could scarcely be obtained by other means. Provided obvious precautions are observed, the *a priori* objections urged against these two methods by Stephenson and Rhodes do not seem borne out in actual practice. Perhaps the real value of these methods is shown, not so much by the actual figures that are finally deduced, but rather by the minor inferences incidentally drawn—the side-lights thrown on examiners, children, and modes of marking—details far too numerous and specialized to set down in print. A second practical corollary is this. All methods of marking English composition contain a large element of unreliability; yet its amount can evidently be greatly reduced by standardized instructions and by the training of examiners. Although the analytic method of marking appears, on the whole, to be the best of any *single* principle, I do not wish to be understood as recommending it to the exclusion of every other; indeed, both the

quantitative results and the incidental observations confirm the more eclectic view already indicated by Burt. "In assessing a script as in assessing a child, both the analytic and the synthetic methods have their value: we cannot afford to neglect either. The analytic method requires alert attention; if based on the experience of many individuals, or, still better, upon prior investigation and research, it should cover all conceivable points in a way that no home-made scheme of any single examiner, however competent, could be expected to do, and further it can give each point its relative weight; it thus ensures due recognition of every aspect—the less obvious as well as the more superficial; it requires all examiners to note the same things and to weight them in the same way; above all, it is the best method for training the young and inexperienced beginner who is new to the task of examining. On the other hand, the intuitive or impressionistic method corrects many faults to which a crude, mechanical, quantitative dissection might inevitably lead . . . It allows us to judge the candidates' work by its general form or *Gestalt*, i.e., as a whole rather than as a mosaic of disconnected items; and thus permits us to grant full value to elusive and organic qualities that could scarcely be catalogued, or decomposed into separate portions. But the personal impressions of an untrained examiner may be worse than useless; hence it is unquestionably a method for the more experienced."¹

¹ *Loc. cit. sup.*, p. 27.

AGE ALLOWANCES IN A JUNIOR SCHOLARSHIP EXAMINATION.

PART II.

By J. B. THOMSON DAVIES.

- I.—*The previous investigation.*
- II.—*A comparison of allowances for English and Arithmetic.*
- III.—*The method of quarterly percentile curves.*
- IV.—*Three years' results.*
- V.—*Some allied problems.*
- VI.—*Summary and conclusions.*

I.—THE PREVIOUS INVESTIGATION.

THIS investigation began in 1929, in connection with a large County Authority whose ten-year-old school population is about twenty thousand children. Its results up to and including the 1935 Examination were published in this *Journal* in Vol. VI, June, 1936.

In 1935 two important steps were taken: (1) For the first time a sliding scale of allowances calculated from the results of the current examination was applied to about two thousand borderline candidates: the object of this was to correct the flat-rate basic age allowance of 1·2 per cent per month of the maximum marks which had been applied to the Arithmetic+English totals of about 14,500 candidates; (2) A change in method was made. Before 1935 I had experimented with the method recommended by Professor Godfrey Thomson¹, under whose guidance much of this investigation was carried out. His method had, however, proved really difficult to apply in an examination where the entry of the younger candidates in a year-range was considerably less than that of the older candidates: roughly only 30 per cent of the 10-10½ groups sat for the examination as against 40 per cent of the 10½-11 group. A complete change of method was therefore attempted in 1935. The calculations were based on a study of the four curves of percentile ranks obtained from the results of candidates born in the four quarters of the year. Nothing definite had by 1935 been done with regard to separating

¹This *Journal*, Vol. II, 1932, Parts I and II, *The Standardization of Group Tests*.

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English from arithmetic in the calculation of age allowances ; throughout, the two subjects have each had the same maximum of 100 marks and the marks have been adjusted so that the scores have the same standard deviation, usually about 20.

The Local Education Authority has again kindly permitted me to use figures connected with their examinations ; it should be noted that they are in no way responsible for any of the opinions here expressed.

II.—A COMPARISON OF AGE ALLOWANCES FOR ENGLISH AND ARITHMETIC.

Having discovered a method suited to the peculiar circumstances of this authority's examination, we found it easy in 1936 to deal separately with the English and arithmetic results of the children born in the different months of the year. We present three years' results in tabular form, drawing attention to the variation from one set of papers to another in the difference between English and arithmetic bonuses, and also to the variation from one set of papers to another in the differences between the bonuses required by candidates high in the lists and those required by candidates lower in the lists. Nothing could better illustrate the necessity of calculating age allowances from the results of the actual examination with which they are connected.

Although it is true that the separation of arithmetic from English is of less importance in some examinations than in others, and although when a candidate's marks in the two subjects are about level the separation of the age bonuses makes no difference, yet the candidate high in English and low in arithmetic ought in the majority of papers to have a higher allowance than the candidate high in arithmetic and low in English. Thus the separation of the two subjects may result in a small but important change in the personnel of the successful candidates.

As the authority's main examination now concerns only children who are between the ages of ten and eleven about the time of the spring examination, and as this group is always "uncreamed," we restrict ourselves to ten-year-olds. It should be noted that in 1938 the arithmetic papers were made much easier in view of the great shortening of the time given to arithmetic in the time-tables of the reorganized junior schools.

The extension of the sliding scale down to percentile rank 50 in 1938 was made possible by the development and improvement of the new method. All the figures in Table I have been corrected for the error referred to in Section IV.

TABLE I.
COMPARISON OF ENGLISH AND ARITHMETIC AGE ALLOWANCES.

<i>Monthly Bonuses as Percentages of Maximum Marks.</i>						
<i>Candidate's Percentile Rank.</i>	1936		1937.		1938.	
	<i>English.</i>	<i>Arithmetic</i>	<i>English.</i>	<i>Arithmetic</i>	<i>English.</i>	<i>Arithmetic</i>
95	1.01	1.20	0.71	1.23	0.64	0.77
90	1.03	1.25	0.75	1.25	0.72	0.86
85	1.07	1.31	0.78	1.29	0.77	0.96
80	1.10	1.36	0.82	1.31	0.77	0.96
75	1.15	1.48	0.90	1.33	0.77	0.96
70	1.20	1.53	0.97	1.35	0.77	0.98
65	1.25	1.58	1.06	1.36	0.77	0.98
60	—	—	—	—	0.80	0.98
55	—	—	—	—	0.82	1.00
50	—	—	—	—	0.84	1.00

III.—THE METHOD OF QUARTERLY PERCENTILE CURVES.

Separate illustrations of this method were published in 1936 in two places¹. The method was then untested save for its good results in the spread of about 2,400 awards in 1935 over the twelve birth-months; it had been hammered out in haste in the throes of the 1935 examination; it had at that time been subjected only to general criticism. In fact, a small mathematical error escaped notice until the summer of 1938, when a worker in another area drew attention to it. The method itself has now been clarified and improved by experience; it has been tested by a wider range of results, and it has shown itself suited to the solution of other educational problems.

With a monthly entry varying not only with chance, but also according to the law that the younger a child was in the year-group, the less was his chance of being entered, the best-fitting-straight-line method seemed unsafe unless we weighted the scores according to the monthly entry. Such weighting resulted in mathematical labour which was

¹DAVIES and JONES: *Selection of Children for Secondary Education*, pp. 149-154.
—This *Journal*, Vol. VI, 1936, Part II.

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difficult for a busy worker in an administrative centre. Professor Thomson had suggested that we should assume that the missing children in the younger months were all the least able of their group, and that we should level the entries by cutting off at the bottom the extra entries for the older months. In practice we found this assumption too great a risk: we knew from the performance of children who sat for the first time as eleven-year-olds that some of the abler youngest children were not entered as ten-year-olds. It has also become clear that the reducing of monthly or quarterly entries by lopping off those with the lowest marks breaks the law of normal distribution so flagrantly that it vitiates the results: reduction of entries must be made with normal distributions in mind. It was felt that we required a method which throughout kept us close to the awkward facts of the situation. We remembered also the small authority who can never expect anything like an even monthly entry. The smaller the numbers the more serious is the part played by chance.

If the taking of such a small interval as a month concealed the natural law of growth by irregularities due to chance, the obvious step was to increase the interval in a desire to smooth the figures. We propose to illustrate the development of this method by using the 1938 ten-year-old arithmetic figures for 1,022 candidates, these forming the representative sample (for a complete entry of 7,682 ten-year-olds) marked by the chief examiners. Table II gives the figures.

TABLE II.
ANALYSIS OF ARITHMETIC MARKS OF 1,022 CANDIDATES.

<i>Age Group.</i>	<i>Number of Candidates in Various Mark-ranges.</i>										<i>Totals</i>
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	
10-10½..	6	19	28	43	47	42	23	14	8	2	232
10½-10¾..	4	20	25	54	38	37	37	16	8	2	241
10¾-10⅞..	1	15	28	46	35	57	39	24	12	5	262
10⅞-11 ..	0	11	21	54	55	55	45	27	15	4	287
TOTALS ..	11	65	102	197	175	191	144	81	43	13	1022

(1) Despite irregularities the underlying laws can now be clearly seen. The results improve steadily from quarter to quarter of the year. For an age allowance we require the best approximation to the monthly

increment at different points of the order-of-merit list. The growth laws are even at this stage dimly seen in the columns, the distribution laws in the rows. (2) Too few of the youngest children have been presented. (3) Chance sometimes gives results markedly out of keeping with the natural laws underlying the table: e.g., in row $10\frac{1}{4}$ - $10\frac{1}{2}$, column 60-69, 37 is unusually high whether you read it in its row or in its column; in row $10\frac{1}{2}$ - $10\frac{3}{4}$, column 40-49, 35 is unusually low whether in row or column.

The 232 cases of the first row represent 4.55 per cent of the total ten-year-old births in that quarter in the area controlled by the authority; 4.55 per cent of the total for $10\frac{1}{4}$ - $10\frac{1}{2}$ is 227 so that 241 is an excess of 14; 4.55 per cent for $10\frac{1}{2}$ - $10\frac{3}{4}$ is 232 so that the excess in row three is 30; 4.55 per cent for $10\frac{3}{4}$ -11 is 242 so that the excess in the last row is 45. The standard entry suggestion would mean adjusting our figures so as to give totals of 232, 227, 232, 242 for the four rows. In practice we have assumed that half of the excesses are due to older children being entered in greater numbers because they are older and that half are due to the older material being better. It is probable that with time we shall ascribe the entire excess to the first cause only and make the entire reductions of 14, 30 and 45 in the second, third and fourth rows. In 1938 we reduced them by 7, 15 and 22 respectively.

At this stage, therefore, the figures in the above table are smoothed, the reductions of 7, 15, and 22 being made in such a way as not to interfere with a fair expression of the growth laws underlying the table. The result is that instead of the crossing percentile rank curves which illustrated the previous article we are now drawing a set of four distinct curves which show clearly the law of advance from quarter to quarter for a very considerable portion of the order of merit list—in 1938 down to percentile rank 50. To those who work by this method it becomes obvious that since the final calculations are based on the differences between the first and fourth percentile curves at different percentile ranks, the second and third percentile curves contribute nothing to the final solution. The first and fourth curves, however, cannot be drawn so as to represent the situation fairly unless we consider the figures for all four and at least sketch in all four.

The first stage in the smoothing of the figures then consisted in rearranging and altering the figures in Table II by considering the laws governing both columns and rows and at the same time reducing the totals by 0, 7, 15, 22. We do not hope for more than good approximations. Table III shows the alterations.

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TABLE III.
SMOOTHING AND CORRECTION OF QUARTERLY ENTRIES.

Age Group.	Number of Candidates in Various Mark-ranges.										Totals
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	
10-10½	6	19	28	43	47	42	23	14	8	2	232
Smoothed	6	19	28	43	47	42	26	14	6	1	232
10½-10¾	4	20	25	54	38	37	37	16	8	2	241
Smoothed	4	20	25	49	43	41	33	16	8	2	241
Corrected for uneven entry	3	17	25	46	43	41	33	16	8	2	234
10¾-10⅞	1	15	28	46	35	57	39	24	12	5	262
Smoothed	1	15	28	42	46	50	41	24	12	3	262
Corrected for uneven entry	0	8	21	42	46	50	41	24	12	3	247
10⅞-11	0	11	21	54	55	57	45	27	15	4	287
Smoothed	0	11	21	48	57	59	45	27	15	4	287
Corrected for uneven entry	0	3	13	42	57	59	45	27	15	4	265

Each row is then reduced to percentages and the cumulative percentages are entered, enabling the four percentile rank curves to be drawn (see Table IV).

TABLE IV.
PERCENTAGE ANALYSIS OF ARITHMETIC RESULTS OF
1022 CANDIDATES (SMOOTHED).

Age Group.	Percentage of Candidates in Various Mark-ranges.										Totals	
	0-9	10-9	20-9	30-9	40-9	50-9	60-9	70-9	80-9	90-9		100
10-10½ Cumulative Percentages	2.6	8.2	12.1	18.5	20.2	18.1	11.2	6.1	2.6	0.4		100
		10.8	22.9	41.4	61.6	79.7	90.9	97.0	99.6	100		
10½-10¾ Cumulative Percentages	1.3	7.2	10.7	19.7	18.4	17.5	14.2	6.8	3.4	0.8		100
		8.5	19.2	38.9	57.3	74.8	89.0	95.8	99.2	100		
10¾-10⅞ Cumulative Percentages		3.2	8.5	17.0	18.6	20.3	16.6	9.7	4.9	1.2		100
		3.2	11.7	28.7	47.3	67.6	84.2	93.9	98.8	100		
10⅞-11 Cumulative Percentages		1.1	4.9	15.9	21.6	22.3	17.0	10.2	5.7	1.3		100
		1.1	6.0	21.9	43.5	65.8	82.8	93.0	98.7	100		

Those practised in the drawing of such curves become accustomed to points indicating rather than strictly defining the position of the curve and find that the sequence of four curves is a guide to the best drawing of the approximate first and last curves. This drawing embodies the second stage in the smoothing of the data.

The results are given in Table V. The mid-year marks are obtained from the complete results for the year-group by percentaging them and then drawing the corresponding curve for their percentile ranks.

TABLE V.
MONTHLY BONUS FOR VARIOUS PERCENTILE RANKS.

Percentile Rank	95	90	85	80	75	70	65	60	55	50
Nine months' diff. in marks	7.0	7.7	8.6	8.6	8.6	8.8	8.8	8.8	9.0	9.0
Mark-difference per month	0.77	0.86	0.96	0.96	0.96	0.98	0.98	0.98	1.00	1.00
Mid-year Mark	80	73	69	65	62	59	56½	54	52	49

The third and final stage in the smoothing of the data takes place as always in making the necessary monthly tables based on Table V.

IV.—THREE YEARS' RESULTS.

This method has now been used for three years for separate English and arithmetic age allowances in two distinct examinations. In the final score the Intelligence Test has been given equal weight with each of the other two: its age allowance has been dealt with by Professor Thomson by the best-fitting-straight-line method and intelligence quotients. Confining ourselves to the figures for the ten-year-old entry, we give in Table VI the awards for the three years 1936-1938, both as monthly and as quarterly distributions: each figure represents the awards to children born in any period as a percentage of the total number of children in the schools born in the same period, be it month or quarter-year. The total number of children involved is always about twenty thousand, and the actual candidates well over seven thousand. In 1937 the age-range was altered from 10-11 on April 1st to 10-11 on March 1st; thus we had only eleven months of "uncreamed" candidates in 1937.

It is obvious that taken over several years the results are not as completely satisfactory as they might be; one tends to suspect the repetition of the lowest results for the oldest quarter-year, although the difference is admittedly slight. We shall return to this point.

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TABLE VI.
MONTHLY AND QUARTERLY DISTRIBUTION OF AWARDS, 1936-8.

Year.	Age of Children in Years and Months.												Total
1936	10-11	10-10	10-9	10-8	10-7	10-6	10-5	10-4	10-3	10-2	10-1	10-0	
	6.3	5.4	7.0	7.8	7.1	6.4	6.7	6.9	7.2	7.1	6.4	6.0	6.8%
	6.2%			7.1%			6.9%			6.8%			
1937	already creamed	7.4	8.4	8.2	8.0	8.7	8.5	7.0	9.3	8.9	6.9	8.2	8.1%
	7.9%			8.2%			8.3%			8.0%			
1938	8.9	9.2	9.1	10.8	10.7	11.0	8.7	9.4	10.0	9.4	10.2	8.9	9.7%
	9.1%			10.9%			9.4%			9.5%			

We used this method to obtain the correct age allowances for the English and Arithmetic mock-County-Minor papers in a recent large experiment on the reliability of different forms of examinations, and education officers in other areas are reporting favourably on its possibilities. Thanks to one of them a mathematical slip did not pass unnoticed. In calculating the one-month age bonus from the nine months' difference in marks, we have been dividing by 8 instead of by 9, on the analogy of the maximum bonus per year being the monthly bonus taken eleven times! The result is, of course, that the age allowances in the sliding scales have throughout been a little too great. As it is just in the first and last quarters that the error would amount to anything, it seems likely that the results for the oldest quarter-year will very slightly improve, while those for the youngest quarter-year will very slightly fall off, a result more in keeping with the fact that some of the abler young children are still kept back from the examination.

V.—SOME ALLIED PROBLEMS.

This method of drawing a series of curves of percentile ranks has other possibilities. It can be used to compare the examination performances in different types of schools, and, if this be required, it will indicate the amount of a suitable bonus for those whose educational opportunities are poor in comparison with others. It will show the difference in marks or points scored in each subject or test for each percentile rank, and there will be room for a decision as to how much of this difference is due to native ability and how much to educational opportunity. It can be used

to compare carefully boys' and girls' performances. It can be used instead of the best-fitting-straight-line method to obtain standard scores in group tests.

For the sake of comparison I have applied the method recently to figures given in *The Intelligence of Scottish Children* (pp. 62 seq.) for the Raw Scores of 44,210 boys in the Verbal Tests used in the Scottish Survey of Intelligence. This gave a quarterly entry of over ten thousand, and as complete a population as we are ever likely to meet, children of between 10 y. 5 m. and 11 y. 5 m. Percentages were worked out for the four quarter-years and are set out in Table VII.

TABLE VII.
ANALYSIS OF BOYS' RESULTS IN VERBAL TESTS. SCOTTISH MENTAL SURVEY
OF INTELLIGENCE.

Age Group.	Percentages of Boys obtaining Raw Scores of								Totals
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-76	
(I) 10 y. 5 m. to 10 y. 8 m.	10.6	14.7	18.5	23.7	20.0	9.9	2.5	0.1	100%
(II) 10 y. 8 m. to 10 y. 11 m.	8.3	12.2	17.9	23.4	22.4	12.5	3.2	0.1	100%
(III) 10 y. 11 m. to 11 y. 2 m.	7.5	10.5	15.4	22.8	23.7	15.4	4.5	0.2	100%
(IV) 11 y. 2 m. to 11 y. 5 m.	6.0	8.9	14.1	21.9	24.6	18.2	6.0	0.3	100%

In this table little smoothing is, of course, required, but the reading of rows and columns combined showed in the first line 9.9 too low with 0.1 too high (they were changed to 10.0 and 0), and in the second row 8.3 and 12.5 too low and 17.9 and 22.4 too high (they were changed to 9.1, 17.2, 22.1, 12.7). The four quarterly percentiles were drawn and the first two lines of Table VIII were taken from $X_{IV} - X_I$ or ϕx of IV - x of I, a large scale being used in order to obtain as accurate readings as possible. The diagram on next page is a small-scale illustration of the method, the curves being labelled to correspond with the rows of Table VII.

The last row of Table VIII was obtained by taking the results for the whole year-range, percentaging them and drawing the percentile curve representing them: this may be taken to represent the scores for a candidate born exactly in the middle of the year.

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ALL-SCOTLAND, BOYS ONLY.

Quarterly Percentile Curves, Verbal Test

x = Score (44,210 boys).

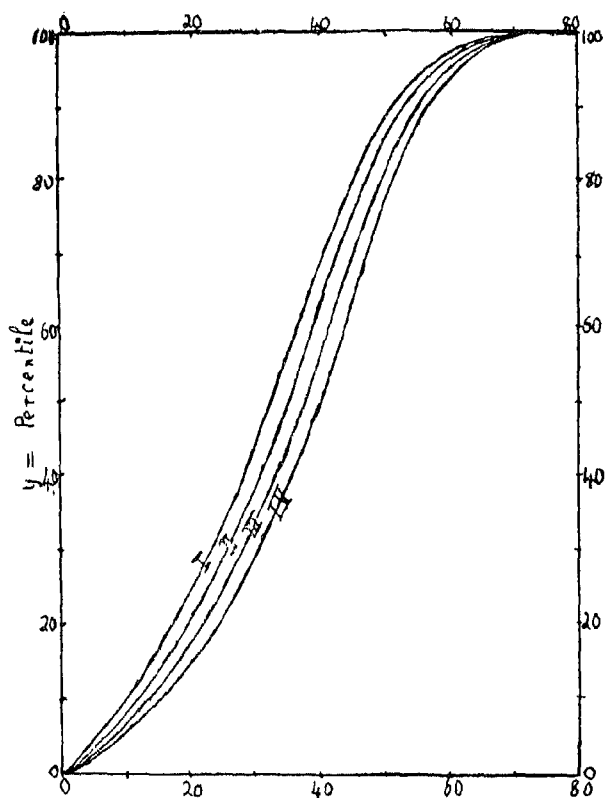


TABLE VIII.

MONTHLY BONUSES. SCOTTISH MENTAL SURVEY VERBAL TESTS
(44,210 BOYS).

Percentile Rank	95	90	84	80	70	60	50	40	30	20	16	10
Difference in Raw Scores for 9 months' difference	4.5	5.7	6.0	6.0	6.5	7.0	7.1	7.2	7.5	7.5	7.0	5.6
Monthly difference .....	.50	.63	.67	.67	.72	.78	.79	.80	.83	.83	.78	.62
Raw Score for mid-year	59	55	51	49	44	40	36	32	27	20	17	12

Standard scores for the twelve months of the year-range for different percentile ranks were then calculated from $m \pm \frac{1}{2}a$, $m \pm 1\frac{1}{2}a$, $m \pm 2\frac{1}{2}a$, $m \pm 3\frac{1}{2}a$, $m \pm 4\frac{1}{2}a$, $m \pm 5\frac{1}{2}a$, where m is the mid-year raw score and a the monthly difference for the same percentile rank. These calculated results are given in Table IX to the nearest whole number, without further smoothing. Those interested should compare them with those in the similar table in *The Intelligence of Scottish Children* on page 70, boys' scores (smoothed).

TABLE IX.

STANDARD SCORES OBTAINED BY QUARTERLY PERCENTILE METHOD.
SCOTTISH MENTAL SURVEY VERBAL TESTS (44,210 BOYS).

P.R.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
95	62	61	61	60	60	59	59	58	58	57	57	56
90	58	58	57	57	56	55	55	54	53	53	52	52
84	55	54	53	53	52	51	50	50	49	49	48	47
80	53	52	51	51	50	49	49	48	47	47	46	45
70	48	47	47	46	45	44	44	43	42	41	41	40
60	44	43	43	42	41	40	40	39	38	37	36	36
50	40	40	39	38	37	36	36	35	34	33	32	32
40	36	36	35	34	33	32	32	31	30	29	28	28
30	32	31	30	29	28	27	27	26	25	24	23	22
20	25	24	23	22	21	20	20	19	18	17	16	15
16	21	20	20	19	18	17	17	16	15	14	13	13
10	15	15	14	13	13	12	12	11	10	10	9	9

The comparison may be summed up by pointing out that these figures are exactly the same as the smoothed figures on page 70 except for the forty-two underlined figures, which in forty cases are one less and in two cases one more. Considering the approximate nature of all work with standard scores we are confidently using this easy method in such calculations for Group Tests. One improvement is being made: the mid-year Raw Score (fourth line in Table VIII) is read to the first decimal place.

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VI.—SUMMARY AND CONCLUSIONS.

(1) Sliding scales of age allowances depending on the candidate's birth month and his percentile rank, but not on his marks, have now been used for four years. For each year's examination the scales are calculated on the results obtained by about a thousand children out of an entry of over seven thousand, these forming the representative sample whose scripts are marked by the chief examiners.

(2) For three years separate scales have been calculated for English and arithmetic. The arithmetic allowance is always greater than the English, but the amount of difference varies greatly from year to year and depends on the papers set. This emphasizes the necessity for calculating age allowances on the results of the current examination separately for English and arithmetic. In particular this avoids injustice to the candidate good at English but weak in arithmetic.

(3) The method employed is to separate the results of candidates born in the four quarters of the year, smooth the figures and correct them for uneven entry of candidates. A set of four percentile curves is then drawn which represents the results at n years $1\frac{1}{2}$ months, n years $4\frac{1}{2}$ months, n years $7\frac{1}{2}$ months, and n years $10\frac{1}{2}$ months. The difference between the x 's of the first and last curves for various percentile ranks, when divided by 9, gives a very good approximation to the monthly increment required.

(4) The analysis of three years' results shows the soundness of the method. It keeps so close to awkward facts that it is suitable both for the small examination and for one with a very uneven entry.

(5) This method is equally well suited to obtaining "standard scores" for group tests. The comparison of percentile curves is an excellent way of comparing boys' and girls' work, and of comparing the level of success in different types of schools with a view to recognizing differences in educational opportunity, such as those due to the war.

THE STUDY OF SOCIETY: METHODS AND PROBLEMS.

Edited by F. C. BARTLETT, M. GINSBERG, E. J. LINDGREN, and R. H. THOULESS. (London: Kegan Paul, 1939, pp. xii+498. 10s. 6d.)

IN this book we have nineteen chapters contributed by seventeen writers. Is the volume but another collection of essays, each one giving the views of the individual writer, but lacking any central theme or connection between the different contributions? Such collections are unfortunately only too common, but this volume is very different indeed. The history of the book is in itself the story of an interesting example of co-operative study and investigation. About four years ago three unnamed members of the group ultimately responsible for the publication of this book, and interested in the scientific study of many problems of modern complex societies, met to discuss the possibilities of applying the reliable methods of psychology, anthropology and sociology to this study. From these discussions emerged the idea of forming a small group of persons interested in the research aspect of one of these three studies; the members of this small group were to meet together for free discussion and criticism of all contributions made.

The method followed in the production of the book is also to be noted. Each chapter was written, circulated among the members of the group, and thoroughly discussed at a meeting of the group. The result therefore is that each chapter is a real co-operative product and may be said to represent a considerable amount of agreement among the members.

The book is primarily designed for use by those who are either engaged upon, or likely to be engaged upon, research in one of the social sciences. The needs of the intelligent general reader are not entirely ignored, but the main significance of many parts of the book will not be appreciated by anyone without some previous psychological training.

The first need for the researcher and the potential researcher is to be given a survey of the methods and contributions in the three main studies. Thus the general design of the book is determined by this requirement.

The book is divided into four sections dealing respectively with Some Problems of Social Psychology, Social Applications of Psychological Tests and other Methods, Some Methods of Social Anthropology, and Some Methods of Sociology.

In the first contribution Professor Pear discusses "Some Problems and Topics of Contemporary Social Psychology." His selection is determined

by the principle that the problems are "especially important for psychological theory or practice." The topics so selected vary from Investigations of Unemployment to The Cinema, from Attitudes to Radio, from War to Conversation. On all of these Professor Pear throws much light, shows how psychological methods and techniques have been applied and suggests many other questions that may lend themselves to future investigation. The social importance of all of these topics is stressed and Professor Pear deals with them all in a thoroughly interesting manner. The chapter forms a pleasant introduction to the book, although perhaps it is not always clear how these topics are especially important for psychological theory or practice.

Having appreciated to the full the easy pleasant style of the first chapter, one is ready to enjoy the tonic effect of Professor Bartlett's contribution on "Suggestions for Research in Social Psychology." His opening sentence is: "Anyone who reads the various sections of this book will be prepared to accept the view that the greatest need of social psychology at the present time is for more and better research." This is the guiding principle throughout the chapter and he rigidly insists on the necessity of maintaining a scientific attitude in all the many and varied lines of research suggested. He is very helpful also in his advice to the amateur investigator in psychology, and outlines many researches in which the help of the amateur would be particularly welcome; but he emphasizes very strongly the need for the scientific attitude in these studies.

He gives (p. 42) an admirable list of the main rules to be observed by the amateur investigator. Among them is this: "If informants are asked to keep records, remember that it has been shown that records filled in periodically and at lengthy intervals are likely to be less accurate than records of the same events filled in regularly at short intervals." Although this is no doubt, in general, sound, is there not also to be noted the possibility that, with the short interval, the observer may report not merely the actual observation, but the record made on a previous occasion and now remembered? It would seem that both types of records are advisable.

The social psychologist would welcome the co-operation of the amateur investigator in such subjects as: the kinds of noises to which people in various kinds of environment most commonly object, and the reasons for the dislike; the types of situation which tend to provoke laughter within specific social groups; preferences for various kinds of entertainment and their variations with age, sex, and occupation; records of speeches in various circumstances as a basis for a study of

thinking in different "social settings"; the various determinants of social and political attitudes.

The whole chapter is a carefully reasoned statement of the importance of research of the highest type in social psychology.

Dr. H. T. MacCurdy writes a stimulating chapter on "The Relation of Psychopathology to Social Psychology," and makes many attractive suggestions on the subject.

The relationship is one which urgently needs investigation, and Dr. MacCurdy has clearly indicated many lines of research: a valuable suggestion is under the heading of what he calls "comparative psychiatry."

Dr. Mary Collins contributes a long and very carefully compiled chapter on "Modern Trends in Child Psychology." In conformity with the general aim of the book she deals very thoroughly but critically with methods in child psychology and discusses many results. The chapter is an excellent presentation of the application of modern investigational methods to the difficult and complex problems of child psychology.

Dr. Thouless completes the first section of the book with a short but useful chapter on the very perplexing question of "Problems of Terminology in the Social Sciences." His criticisms and illustrations are apt, but one looks almost in vain for suggestions for terms which might be used to avoid some of the confusion which is now so common in the social sciences owing to the ambiguity of many of the terms.

The second section of the book opens with a chapter by Dr. Thouless on "Scientific Methods and the Use of Statistics." He compares and contrasts pre-scientific and scientific methods, emphasizes the essentials of the latter, points out the pit-falls, helps to prepare the would-be investigator for his task, and stresses the importance of reasoning and speculation in scientific method. He then battles valiantly with the difficulties of elementary statistics, the problem of sampling, reliability of the mean of a sample, correlation, and factor analysis. He finishes his chapter with a discussion of the function and limitations of statistical methods.

He indirectly criticises some modern work, and thus emphasizes the importance of correct methodological procedure. The following is an illustration of his apt criticism: "Problems of the interconnectedness of measurements may be solved in other ways than by the calculation of correlation coefficients. It has frequently happened that the tradition of working out correlation coefficients has led workers to calculate these even when other ways of treating their data would have been more appropriate. This is particularly the case in educational psychology."

Dr. Blackburn has given a careful summary of "Intelligence Tests." He examines the Binet and the Spearman types of testing in some detail, gives an interesting comparison between the two approaches, and discusses the application of Intelligence Tests. For the general reader the chapter is a thoroughly competent although not a particularly easy survey.

This chapter is appropriately followed by a valuable contribution by Dr. Nadel on "The Application of Intelligence Tests in the Anthropological Field." He analyses very acutely some of the many difficulties, points out the erroneous deductions that are very frequently drawn, and concludes that "it is a question whether tests can ever be constructed which will reveal the psychological mechanism of intelligence as such, and eliminate the influence of cultural and educational opportunity." His experience in the anthropological field enables the author to work from first-hand knowledge of his subject, and his suggestions for the application of tests to primitive peoples will be read with interest and appreciation by those concerned with intelligence testing.

Dr. P. E. Vernon follows with a lucid discussion of "Questionnaires, Attitude Tests and Rating Scales." His review of the importance of the questionnaire in psychological research is thorough and scientific, especially his comments on the interpretation and representativeness of results. He examines thoroughly the vexed question of rating scales, and his criticisms are apposite. His analysis, too, of personality tests, both self-rating and rating of others, is important.

Another interesting contribution is that by Dr. Earl on "Some Methods of Assessing Temperament and Personality." The author is dealing with many controversial subjects in this chapter and many readers will not be completely satisfied with some of his definitions and conclusions: for example in particular, I suggest that his definitions of temperament, character and personality may need careful analysis.

Dr. Earl summarizes the present position and his own attitude in his final sentence: "Whatever methods are used at the present time their success may be said to depend largely on the restraint with which the evidence obtained is related to all the other data available about the individual."

A short but instructive chapter follows by Mr. Rodger on "The Work of the Vocational Adviser." Again one has the experience of the researcher and field-worker expressing itself against a background of theoretical knowledge, and the result is a clear picture of the work of the vocational adviser, its objects, its methods and its difficulties.

The two remaining sections of the book deal with methods in Social Anthropology and Sociology, and as such are beyond the scope of this Journal. But chapters dealing with Field Work Methods in Social Anthropology by Dr. A. I. Richards, with The Collection and Analysis of Folk-Lore by Dr. Lindgren, and with The Methods of Social Case Workers by S. Clement Brown, all reach a high standard. The final chapter by Professor Ginsberg on The Problems and Methods of Sociology is in every way admirable.

Each chapter is followed by a very extensive list of references, and some by an additional list of books for further general reading. The cross references between chapters are numerous.

The nature of the book—a collection of essays—makes it difficult to give a “critical notice” of the usual type. One general point, however, may be added: the reader should note that the book does not profess to be “A study of Society”; it is a discussion, and an introductory one, of the methods and problems of the study of society. Excellent as it undoubtedly is on the examination and discussion of method, it does not deal closely with some of the main problems of a complex society. However this may be, the book is one of the most important contributions that have appeared in recent years to the study of social problems, and may well serve as a guide to researchers when the projected Social Psychology Section of the British Psychological Society materializes. In the meantime the editors are to be congratulated on the completion of one of the most encouraging examples of co-operative endeavour in recent psychological work.

E. C. CULL.

OUTLINES OF RESEARCHES REPORTED IN THESES PRESENTED FOR HIGHER DEGREES OR DIPLOMAS.

THESE OUTLINES MUST BE SUBMITTED THROUGH THE HEAD OF
THE DEPARTMENT IN WHICH THE RESEARCH WAS CARRIED OUT.

The Effect of Bilingualism on General Intelligence : an Investigation carried out in certain Dublin Primary Schools.

Thesis accepted for the Ed.B. Degree, University of Glasgow, 1939.

By WILLIAM A. STARK.

At the present stage of the revival of the Irish language in Eire there can be distinguished in the English-speaking parts of the country, e.g., the city of Dublin, two main types of primary schools : (a) all-Irish schools, in which the sole medium of instruction is Irish and English is taught as a school subject, and where Irish is the language of intercourse both in classroom and playground, though a little less than 10 per cent of the pupils come from Irish-speaking homes ; and (b) non all-Irish schools, where there is a daily Irish lesson but English is the medium of instruction for other subjects ; in some of these schools, however, certain subjects may be taught through Irish. Generally speaking, children in (a) schools are bilingual, and in (b) monoglot.

In the investigation the general intelligence of a group of school children between ten and twelve years of age from five all-Irish schools in the city of Dublin was compared with that of a group of the same age range from four non all-Irish schools in the same city. The tests used were the Dawson Mental Tests A and B, group verbal tests, and the Passalong Test, an individual performance test. By kind permission of Harrap and Co., an Irish translation of the Dawson Mental Test B was made and used as one of the tests for the all-Irish school group. This test was found to have a satisfactory correlation of $\cdot84 (\pm \cdot02)$ with the English form of the test.

In the Dawson Mental Test B (which the bilingual group took in Irish) the mean score of 271 bilingual children was compared with that of 297 monoglot children. There was found a significant difference of five points in favour of the monoglots at the age of 11-12 with the difference at the earlier age so small as to be negligible.

With the Dawson Mental Test A (which both groups took in English) it was not found possible to test more than a comparatively small number of the children in each group who had taken Test B. Thus on this occasion only sixty-five bilingual and 104 monoglot children were tested, they being selected at random from the original testees. A comparison of the mean score of each group here showed the bilinguals to be superior at each age by thirteen and seven points respectively, both differences being significant.

No significant difference between the two groups was found in the individual performance test, and although the number of children tested was

small, forty-one in each group, this result is in agreement with that of other investigators when comparing bilingual and monoglot school children by means of non-language tests.

From the general results there appeared to be evidence to show that the early acquisition of a second language at school does not necessarily weaken the home language but may strengthen it. Children with an innate verbal facility of a high degree may find the early acquisition of a second language beneficial to their mental development.

The investigator wishes to thank the Carnegie Trust for a research grant in connection with this investigation.

A Comparative Study of Six Group Tests of Intelligence at the Pre-Qualifying Stage.

Thesis accepted for the Ed.B. Degree, Glasgow University, 1939.

By JOHN M. URQUHART.

Aim.

In January, 1937, the Scottish Child Guidance Council issued the report of a Sub-Committee on Mental Tests in use in Scottish schools. Section III of the report deals with group tests and over a score of these were quoted as in frequent use in clinics and schools. The question then arose as to whether there was any basis for intelligent choice among these tests, and this investigation was undertaken with a view to answering it.

Experiment.

Six tests were selected (those most highly commended in the report) and administered to two classes in a Glasgow school—being given in one order to Class A and in the reverse order to Class B. This gave a total group of eighty pupils whose ages ranged from $10\frac{1}{2}$ – $12\frac{1}{2}$ years with a mean of $11; 10\frac{1}{2}$. An unselected group of fifty of these whose mean age was $11; 10\frac{1}{10}$, were tested individually with the Stanford Binet (Terman Revision). The school was in a typical working-class area and the classes were subject to no process of selection—facts shown by the mean and scatter of all the test results.

Analysis.

A threefold approach was taken to the assessment of the value of the tests: reliability, validity, and standardization.

The index of reliability was obtained by the 'split-half' or 'odds-evens' method, first obtaining r_{HH} and then the reliability of the whole test from Spearman's formula
$$\frac{2r_{HH}}{1+r_{HH}}.$$

The validity of a test is usually determined by the correlation between the test and some reliable criterion. Two criteria were available: the scores on the Stanford-Binet for the group of fifty and the weighted average of the group tests for the group of eighty. Presumably the average of six tests has more predictive value than the score of any one of them. The correlation of each test with those criteria gave an index of its validity.

Finally, the standardization was tested by a comparison with the Stanford-Binet norms, which were taken as the standard. The method was to determine if the mean of the deviations of the IQ score of each test from the Stanford-Binet score differed significantly from zero. Three tests

gave a positive difference, and three a negative difference, suggesting that the Binet provides a good standard. The S.D. of the array of differences was calculated and from the S.E. the significance of the mean difference from zero could be estimated.

TABLE OF RESULTS.

	Tomlinson's Northern Test of Edu- cability.	Ballard's Columbian Test.	Dawson Test, Form A.	Kelvin Measure of Mental Ability.	National Form A2.	Thomson's Northumber- land, No. 1.
<i>Reliability :</i>						
<i>r_{HH}</i> .....	.87	.86	.76	.63	—	.91
<i>r</i> .....	.93	.92	.86	.77	.92*	.95
<i>Validity :</i>						
Correlation with Wt. Av. ....	.90	.88	.86	.77	.86	.81
(88 Group)	± .020	± .024	± .028	± .043	± .028	± .036
Correlation with Stanford-Binet.....	.81	.76	.85	.73	.72	.71
(50 Group)	± .043	± .059	± .039	± .066	± .068	± .070
<i>Norms :</i>						
Mean Deviations from Stanford-Binet	+2.56 ± .98	-1.72 ± 1.41	-1.52 ± .71	-.28 ± 1.05	+ .16 ± 1.19	+6.18 ± 1.25

Conclusions.

(1) No test stands out in all three aspects as the most pre-eminent and 'best' test to be used.

(2) Three tests—Tomlinson's Northern, Ballard's Columbian, and Dawson's Form A—give consistently high correlations for validity and reliability.

(3) Two tests—Thomson's Northumberland and Tomlinson's Northern—give I.Q.'s that are too high, while Dawson's and Ballard's tests give I.Q.'s that are too low in comparison with Stanford-Binet I.Q.'s. All these would need further standardizing, especially Thomson's Northumberland.

(4) Taking everything into consideration the three most satisfactory tests seem to be Ballard's Columbian, Dawson Form A, and National Form A2. Of the others, Tomlinson's has excellent ranking value, but its norms need revision; Thomson's is badly standardized according to the Stanford-Binet tests; and the Kelvin test has the least useful ranking measure of all the tests.

*Quoted from M. V. Seagoe.

BOOK REVIEWS.

Crooked Personalities in Childhood and After : By RAYMOND B. CATTELL.
(London : Nisbet and Co., Cambridge ; University Press. The
Contemporary Library of Psychology, pp. xii+215.)

This is an exceedingly provocative book. It is also rather mixed as to quality. Some of the chapters are excellent, notably, perhaps, Chapter 7 on the Child Guidance Clinic in Action. Other chapters fail, at least in parts, to reach so high a level, and there is an occasional chapter which is relatively jejune and uninspiring. It ought to be added, however, that there is no chapter in the book entirely devoid of some illuminating phrase, sentence, or even paragraph.

The clinician cannot but feel grateful to Dr. Cattell for writing this book. Such a book with a deliberate popular appeal was very much needed. For some of the chapters the educational psychologist and the practical teacher will also feel grateful. In the case of the pure psychologist—the so-called “academic” psychologist—gratitude for what Dr. Cattell has done must be considerably tempered by disappointment that he has not done more when the opportunity was apparently presented to him.

The last sentence requires some expansion and explanation. The second, third, fourth and fifth chapters are devoted to a sketch of the theories of Freud, Jung and Adler. The sketch is on the whole rather light, but more could scarcely be expected in a book of this size and this intention. Now these theories to a large extent employ a terminology—some call it a jargon—alien to the terminology of “academic” psychology, and it is very desirable that they should be recast as far as possible in the terminology of the established science. That will certainly be done some day. Here was an opportunity to make a beginning, and Dr. Cattell was a very suitable person to undertake the task.

It is really more than a matter of terminology. Until the normal terminology of the science is employed we cannot determine the precise significance of, or assign the exact place in the science to, the alleged facts discovered or the hypotheses, verified or unverified, which have been formulated as psychological theory. This refers more particularly to Freudian psychology. Apart from his employment of a new method of psychological investigation—and of psychotherapeutic treatment—we require to know, in order to determine the place of his teaching in the science as a whole, what facts he has established that were unknown, say, to Charcot, to say nothing of St. Paul, what psychological hypotheses we owe to him, that were not previously formulated, say, by Schopenhauer or von Hartmann, and we cannot know these things with any definiteness until his terminology has been translated. Actually Dr. Cattell credits Freud with the development of a theory of the unconscious which no one who has read Schopenhauer's *World as Will*, or von Hartmann's *Philosophy of the Unconscious* can fail to recognize as borrowed from these philosophers. Freud's real services to psychology were sufficiently great to make it unnecessary for us to credit him with what does not in fact belong to him.

The terminology difficulty is not felt to the same extent in the case of Jung and Adler. The author says that Jung is easier to understand than Freud. That is true of those aspects of Jung's teaching which he deals with, and largely because the terminology difficulty does not obtrude itself. There are, however, other aspects to Jung's teaching, which to the present writer at least are even more difficult than Freud. Adler's teaching is, of course, much more superficial and much more easily grasped than either Freud or Jung, which is part of the reason why the half-fledged psychologist is an eager follower of Adler. Not all clinical psychologists, however, would agree with the view that “it is mainly organ inferiorities and obvious physical traits, such as deficient stature, which are found at the root of the sense of inferiority” (73), whether or not Adler says so.

Chapter 6 on the Scientific Approach, while interesting and suggestive, is perhaps less “scientific” than the reader might expect. In particular there is a tendency to overstress the validity and practical significance of experimental results that are still in a position of lacking confirmation. This is notably the case with respect to “perseveration” and “fluency” phenomena.

The disappointment felt by the "academic" psychologist in these early chapters and in the attempt to link psycho-analytic teaching with McDougall, Spearman, and the behaviourists, quickly disappears when he comes to the later chapters. The cases described by Dr. Cattell are all interesting and instructive, and they are all of a kind which the clinician meets. Possibly, however, they rather tend to exaggerate the seriousness of cases seen at psychological clinics, and it might have been well to add a caveat to that effect.

Finally, the book is written in that easy and racy style which is characteristic of Dr. Cattell, and no one who takes it up will readily lay it down until he has read the last line. J.D.

The Clinical Treatment of the Problem Child: By CARL R. ROGERS.
(Allen and Unwin, pp. 393. 15s.)

Dr. Rogers, who is a director of the Rochester Guidance Center and lecturer in psychology in the University of Rochester, has produced a most useful volume on a topic about which there is much recent literature, but chiefly in a very scattered form. If one sought for one word to describe the chief characteristic of this book, it would, I think, be "comprehensive." Sometimes practical workers in clinics are too much concerned with one particular theory which they seek to illustrate and prove correct, Dr. Rogers reveals a much more objective and catholic attitude. He discusses critically certain fundamental factors such as heredity and the family, and proceeds to examine various forms of environmental treatment. There is a valuable chapter on the foster home as a means of treatment, and the author's summing up of the various lines of evidence on this problem lead him to the interesting conclusion that the foster home is "successful in bringing about a normal adjustment in a majority of cases" (p. 79).

There follows a chapter on treatment in institutions, and here again there is a careful survey of a considerable amount of literature on the subject. Dr. Rogers concludes that institutional treatment "has advantages in dealing with the mentally retarded which no other plan has. It is often helpful in exercising a healthy degree of restraint and control over the child who has for too many years been the egotistical centre of his universe. It has the opportunity of dealing with the child who is emotionally attached to his parents, without breaking down the constructive values of that tie. It frequently can be of assistance to the older child who needs placement but cannot accept foster parents."

One of the most useful chapters of the book is that on the advisability of removing a child from home. The author points out the absence of "any research study worthy of the name which investigates the conditions under which it is advisable to remove a child from his home." In summing up the various lines of evidence on this point Dr. Rogers concludes that the main consideration should be the "affectionate" consideration at home. One or two investigations show that it is very much easier for the social visitor or the child guidance clinic to persuade parents to avoid some gross error of discipline, either of over-severity or over-indulgence, than it is to bring about any change in the emotional attitude of the parent to the child or of the child towards the parent.

A later chapter deals with the school's part in changing behaviour. A weak section here, it seems to me, is that which suggests that one way of giving "constructive help with the insecure attention-getting child" is by increasing the legitimate opportunities for gaining attention. The main example given here, in which this was done, admittedly only produced a temporary improvement, with the return of difficulties later on. This touches one of the great difficulties in the treatment of the child who is always "showing off."

In the last section of the book Dr. Rogers deals with various techniques for dealing with the individual. He is somewhat critical of psycho-analytic methods. His defence of some of the play techniques, in which he does not refer to English workers, is, I think, one of the weaker parts of the book. Another weakness seems to me to be in the inadequate weight given to innate disabilities; but taken as a whole the volumes deserves a welcome as one of the most useful contributions to this complex topic. C.W.V.

A Handbook of Methods for the Study of Adolescent Children: By W. W. GREULICH, H. G. DAY, S. E. LACHMAN, J. B. WOLFE, and F. K. SHUTTLEWORTH. (Society for Research in Child Development, National Research Council, Washington, D.C., pp. 406.)

This book is another interesting example of the value of the kind of corporate research which in many other fields has been more successfully employed in the United States of America than in this country. Five experts in various aspects of child study were given research appointments and were assigned to work at Yale University where facilities were offered them by the School of Medicine and the Institute of Human Relations. During the period of research they were in constant touch with one another and with an advisory committee of the University, the members of which were also specialists in various aspects of human growth. The interests thus impinging on one another were those of experts in anatomy, physiology, human relations, psychology, education and pathology; and the resulting "Handbook" is a kind of encyclopædia of the methods which are proving most successful in each of these various approaches to the study of human development.

The authors have undoubtedly carried out with great thoroughness and competency a broad survey of the methods of study of adolescents now being successfully employed in their respective fields: and the Handbook will consequently prove a useful work of reference for all students of child development, though its value in this direction would have been increased by the inclusion of a good index.

The most obvious limitation of the Handbook is the lack of balance between the treatment of the physical aspects of adolescence (to which 280 pages out of a total of 406 pages are devoted) and the psychological, and particularly the educational and social, aspects of development. For example, the methods used in assessing educational achievement are disposed of in a single page, and without any critical consideration of the traditional, or the recently improved, methods of examinations. The authors themselves may, however, have been aware of this failure of perspective, which was probably due to the constitution of the group and to the absence of sociologist and educationist from its members. O.W.

The Psychology of Physics: By BLAMEY STEVENS. (Sherrat and Hughes, 1939, pp. 267. 7s. 6d.)

If the title of this volume means the interpretation of physical phenomena or what is thought to be the proper way of considering them, it is suitably named. Great advances have been made in physical studies since Kelvin and Clark Maxwell; the physicists' conceptions have had to undergo revisions, and in many instances are now very different from those held at the end of the nineteenth century. This book is a well-intentioned effort to present the modern concepts so as to indicate the position a student should now take up with regard to them. In so far as this has been attempted it has been done well; but between two technical jargons, that of physics on the one hand and of psychology on the other, the work tends to become abstruse and difficulties seem to be made where the author is at pains to clear the way. The reviewer can appreciate Mr. Blamey Stevens' book as an exposition of the 'new' physics with its revised ideas; he finds it difficult to justify immediately the 'psychology' part of its title. It appears, however, as a concept emerging as the reader realizes what the author is trying to do. Indeed, the latter seems to expect this, judging from the two short concluding paragraphs of his thesis.

The student is to be enabled to take up his studies unembarrassed by old-fashioned ideas, and from a reorientated standpoint. In this sense the *Psychology of Physics* is a work for 'beginners' not in the sense of middle form pupils, but for those embarking on the philosophical study of physics. A.P.B.

The Psychology of Conversation: By T. H. PEAR. (London: T. Nelson and Sons, Ltd., pp. ix+171. 2s. 6d.)

This little book is one of the latest additions to the very useful series of Discussion Books. Professor Pear has proved, in his earlier books, his ability to discuss psychologically what he describes as "aspects of social life which interest ordinary

people." Could there be a more fascinating subject for such discussion than conversation? Professor Pear has written this very stimulating book "in the belief that psychologists ought not to avoid problems of human behaviour because they are popularly interesting, and with the hope that other authors may be encouraged to discuss these subjects at greater length." Certainly Professor Pear has shown the importance of many aspects of the subject and has opened up possibilities for much research. His topics range from "The Art of Conversation" to "Techniques of Interviewing" through "Conversations with Oneself"; from "Conversational Tact" to "Children's Conversations." The book will stimulate discussion in many study groups.

The Contribution of Alfred Adler. Individual Psychology Medical Pamphlets, No. 19. (London: The C.W. Daniel Company, Ltd., pp. 72. 2s. 6d. net.)

This pamphlet is issued "by the Medical Society of Individual Psychology of London as a small tribute to the memory of its late President."

Mr. Philip Mairet contributes the first paper and presents the philosophical background of Adler's teaching. Dr. Squires writes on Adler's Contribution to Psychological Medicine, Dr. Dukes on Adler's Contribution to the Study of Organ Inferiorities, and Dr. Woodcock on Adler's particular work on the relation of the Sexes. Sir Walter Langdon-Brown discusses the wider subject of Adler's Contribution to General Medicine. An interesting article is devoted to Child Guidance Work and the school teacher, and the concluding article is a personal appreciation of Adler and his work.

The whole pamphlet is an eloquent tribute to Adler and his work.

Psychology for Business and Industry: By HERBERT MOORE. (London: McGraw-Hill Publishing Co., Ltd., pp. xi+527. 24s.)

This addition to the McGraw-Hill Publications in Psychology fully maintains the high standard of the series. Dr. Moore has had over ten years' teaching experience in the subject of Business Psychology. He has in this volume attempted, with marked success, to deal with "those aspects of psychology which have been shown to be of value in the business and industrial worlds." It represents, therefore, a blend of theory and practice. The author discusses a large number of important topics and has gathered his information from many sources. Vocational Selection, The Construction of Tests, Job Analysis, Training the Worker, Accidents and Fatigue, The Problem Employee, Psychological Problems in Advertising and Selling are all dealt with in a competent way. Each chapter has its topics for report, required readings and supplementary readings.

Mental Conflicts and Personality: By MANDEL SHERMAN. (New York, London, Toronto: Longmans, Green and Co., 1938, pp. viii+319. 12s. 6d.)

The author maintains that conflicts are not all undesirable. Some are beneficial, in that they motivate towards better adjustment to society. It is the way in which conflicts are faced that determines whether they are advantageous or detrimental. After discussing the genesis of conflicts and their nature, Dr. Sherman in a series of interesting and well-written chapters, considers attitudes and conflicts, culture conflicts, conflicts of inferiority and insecurity, sex conflicts, conflicts and neuroses, and conflicts and anti-social behaviour.

This is a useful book for students of child psychology, for clinical workers and for educationists, while certain chapters such as those of attitudes and conflicts and culture conflicts will be illuminating for students of social psychology. While there may not be much that is new in the discussion, for example, of neurotic behaviour, the facts are brought together in a clear exposition, and well illustrated from original material.

M.C.

Can Human Nature be Improved? By F. E. ENGLAND. Rich and Cowan, pp. 239. 3s. 6d.)

Starting with a brief survey of the limitations imposed upon human development by the environment, Dr. England goes on to analyse human nature and to trace the development of instincts and sentiments in the child, the adolescent, and the adult. He indicates many of the causes and types of maladjustment, and shows how these are treated by the psychologist and by the spiritual healer respectively. Psychology and religion are complementary in producing a well-adjusted personality: a personality which will think and feel rightly, and whose thoughts and feelings will result in action of the type described in the final chapter entitled "The Good Life." The author does much to give the psychological knowledge and spiritual insight which he claims are necessary to the achievement of harmonious living, and the book is well written and interesting. M.C.P.

Introduction to Child Study: By RUTH STRANG. (Macmillan, New York, 1938, pp. 681. 12s. 6d.)

This is a revised and extended edition of the book first published in 1930. There has been a good deal of new material on the physical, social, and cultural, as well as psychological aspects of child development, published during the last eight years, and also on the practical application of child psychology in the guidance of the child. To this, and to earlier work, the book is a good general introduction of a semi-popular type, suitable for parents (if they are willing to tackle so large a book), or social workers, and for beginners in child psychology. It is not, and does not profess to be, an advanced text-book in spite of its length.

Can Psychology Help? By ELEANOR A. MONTGOMERY. (Rich and Cowan, pp. 241. 3s. 6d. net.)

This is another of the many popular books on psychology which are written by medical men or women. Like a number of its predecessors it is full of confident, dogmatic statements with little or no evidence to support them. Written with an ample flow of language, often vague and sometimes quite eloquent. Possibly this may help some very "suggestible people."

The Training of Teachers and Grants to Intending Teachers: Report of a Committee appointed by the National Union of Teachers. (1939, pp. xxvii+327.)

Reports of inquiries into the training of teachers are continuous and testify to the deep interest that is taken in what is the central problem of education—the selection, training, and employment of the teaching army which our national system requires. This latest report is marked by careful investigation and wise recommendations. It has collected its evidence over a wide field, and has reduced what must have been divergent views to definite shape and to unanimous recommendations.

Most of the suggestions are fairly familiar and have appeared before as matters of urgent need. That they need repeating is a commentary on the slowness of the changes of the system. To take an obvious example: it has long been urged that two years are not enough for satisfactory training and that the central reform, important above all others, is the extension to at least three years. Everybody agrees about this and it has been put forward from many different quarters; indeed, it was in the mind of Kay-Shuttleworth when he founded Battersea Training College exactly a hundred years ago; in 1846, when he framed the new minutes, he offered grants to trained teachers which increased with the length of their training up to a maximum of three years. Probably few teachers stayed for that length of time, just as few stay now; two years became the normal period and has remained so, with the

result that we are behind nearly every other country in this respect, just as, in this country, preparation for teaching takes less time than for any other profession. Is it because we still regard teaching as an easily acquired art, or as of small national significance?

Much of the virtue of the present report lies in the wide field it covers and the fair sense of balance it keeps. Its recommendations, too varied to summarize here, deal with the education of the intending teacher in the last two years of the secondary school, and suggestions are made for the modification of the Higher School Certificate examination; with the courses in the training colleges designed to meet the needs of the primary and the post-primary school as well as those of specialist teachers; with the teacher's qualifications and the securing of closer equivalence between the qualifications gained in training colleges and in university training departments; with the system of grants to intending teachers, and also with the care and oversight of young teachers during the probationary year.

These recommendations will repay careful study. They show a first-hand knowledge of school problems and conditions; they reveal a sympathetic understanding of the young teacher's needs; and they aim at "a unified educational system and a unified profession." However closely or not we may agree with the recommendations we must admit that they deal with important problems, and discuss them with candour and fairness.

There is one outstanding omission. No consideration is given to a question which has been much discussed in recent years, both by university authorities and by university students, namely, whether the Board of Education grant system now in vogue in the universities, whereby a student on entrance declares his *bona-fide* intention of becoming a teacher and is expected to repay his grants if at the end he adopts another career, should be altered. Is it to be assumed that the Committee prefer its continuance?

A university teacher will read some parts of the report with a suspicion that the university point of view has not been fully considered. New departments, however desirable in themselves, are not easy to establish, and there is much wisdom in the view that new departments can be created too rapidly and with too little regard for the maintenance of university standards. The proposal to establish a Faculty of Education in each university is not convincingly argued: the multiplication of faculties has serious disadvantages, and the post-graduate study of education is not hampered by the absence of a special faculty.

These doubts grow when the report proceeds to discuss the very difficult problem of the connection between training colleges and universities. The students in some training colleges take a full university course for the existing degree in arts or science, and it is suggested that this arrangement should continue. For other students a new "Pass Degree in Education," including both academic and professional work, is advocated, and this would presumably be gained in three years. For other students the training college course should lead to a university diploma, and a student who gained this should be able to complete the requirements for the Degree in Education by attending at the university for one further year. It is suggested that existing courses in Medicine, Engineering, Domestic Science, Architecture and Agriculture are framed on similar principles.

The proposals in this form are not likely to evoke much response from the universities. In the requirements of attendance they fall far below the existing minimum. They include professional training which is to be given not in the university, but which is to count in the university award. On both these counts they differ fundamentally from medicine and the rest, and they raise the questions of control, of standards of work and of examinations in an acute form. The universities may be slow to change, but they have an obvious duty to resist proposals which would imperil existing standards. Nor would it be to the advantage of the teaching profession to promote "degrees in Education" which might be regarded as intellectually inferior to well-established degrees for other students than teachers.

The report ends with the note that there is need for a "radical change" in the system of training teachers and recommends that the Board of Education should set up a Committee to consider the question in the light of the various memoranda now available. It is highly probable that, but for the outbreak of war, a Departmental Committee would already have been set up.

F.S.

The Adolescent Period: a Graphic and Pictorial Atlas: By F. K. SHUTTLEWORTH. (Society for Research in Child Development, National Research Council, Washington, D.C., pp. 246.)

This monograph is a collection of the chief facts concerning adolescents and adolescent development which are suitable for graphical and pictorial representation. It contains an amazing amount of information; including statistics of the number and the money value of adolescents in the United States over a period of years, the main facts concerning the physical growth, changes in the proportions of the body, physiological functions, sexual maturation, health, intelligence, education, special abilities, plays and games, interests and aptitudes of boys and girls, as well as data concerning the occupational and sex adjustments and the behaviour mal-adjustments most usually found in the adolescent period. There is an excellent table of contents at the beginning which, with the useful index at the end, makes it easy to use the Atlas for reference. It might, however, have been an advantage, for the sake of clearness, to have had the sections indicated in the Table of Contents carried through into the actual text; and to have had some of the graphs, where many details are included (such as in Figures 221, 244, 296, 309 and 310) drawn on a larger scale.

There is no discussion of the methods used to obtain the data nor of the significance of the facts collected, though in every case the sources of information are appended and the method of graphical or pictorial representation is clearly indicated. To the trained student, able to assess the probable degrees of validity of generalizations arrived at by very different means, this volume would be a most useful reference book concerning adolescence. It is a veritable mine of information, collected with care and efficiency, arranged with clearness and understanding, and expressed in graphical and pictorial form with surprising ingenuity.

O.W.

Educating for Democracy: Planned and edited by J. COHEN and R. M. W. Travers. (London: Macmillan, pp. xxx+458. 10s. 6d.)

This book is a collection of relatively independent essays by a strong team of twenty-four contributors who deal with various aspects of contemporary education from their individual points of view. The claims made for it on its jacket are misleading and therefore unfair. The papers, as might be expected, do not all reach the standard set by Sir Percy Nunn in the first chapter on Education as a Biological Experiment, but the large majority of them are within their limits informative and suggestive, and their authors write with authority on their chosen subjects. To mention a few chapters only: Lord Raglan makes use of his wide experience to illuminate the question of Freedom and Control; the value of Training Colleges for Teachers is wisely urged by Dr. Wodehouse, who discusses the importance of the non-university college; Mr. Ernest Green deals with adult education under the significant title "Educating Men and Women"; Dr. Crowley contributes a valuable sketch of the lines on which health education should be planned; Mr. Lester Smith describes the organization of education in Manchester; and Dr. Ballard writes in a stimulating way on Aesthetics and Modern Education. Professor Mannheim on "Mass Education and Group Analysis," and Sir Philip Hartog on "The Place of Examinations" in the social system are interesting, though some of their statements may be disputed. Speaking generally, the more theoretical essays are less satisfying than those by practical experts. The weakest parts of the book are the loosely written editorial and the editor's chapter on Psychology and Modern Education. Writers who advocate the introduction of psychology into the general science course of every school might have been expected to know what is meant by a psychological experiment (p. xx).

H.B.S.

Teaching the New Arithmetic: By WILSON, STONE AND DALRYMPLE. (McGraw-Hill, pp. 416, 1939. 18s.)

This is an extremely interesting and stimulating book in which the authors discuss "the aims or purposes in Arithmetic," and outline a syllabus for schools. This syllabus will probably seem revolutionary to many teachers, but it will receive

the warm approval of others who have long advocated such a revision of the content of the Arithmetic syllabus. Throughout, the authors stress the vital importance of purposeful activity on the part of the child, and in this connection the section on written problem work is of particular interest. The book is divided into four parts. The first contains a discussion of aims and of the syllabus; the second deals with specific topics in some detail; the third discusses written problem work, and Part IV contains chapters on such subjects as Methods of Teaching, Remedial Work and the Choice of a Text-book.

This book should be read not only by teachers and intending teachers, but by all those who influence the school curriculum and methods of teaching—by Inspectors and Directors of Education and, perhaps above all, by those who set examination papers in Arithmetic. Since the book is written by American authors for American teachers, some of the suggestions made will need modification for use in English schools, but this in no way diminishes the value of the book for educationists in this country.

Constant reference is made throughout to research work, and there is an excellent classified bibliography. N.M.B.

Alfred Adler: Apostle of Freedom: By PHYLLIS BOTTOME. (London, Faber and Faber, pp. 386. 10s. 6d. net.)

The authoress of this book had exceptional opportunities of knowing Adler. She was a student and a friend; she knew many of Adler's friends; she met him in the home, in the lecture theatre, and in the child guidance clinic; she knew him in prosperity and in adversity. It is thus that she can give us a picture of Adler in his many activities, and of Adler, the man. She traces briefly his early life, childhood, adolescence; his early struggles; his enthusiasms; his successes and his failures. We get some insight into those days spent in the Freudian fraternity, and the unfortunate aftermath. We follow Adler through those days in Vienna when he was becoming a celebrity; we are given some of his reactions. His home life is portrayed with sympathy and understanding. His circle of intimate friends becomes very real. We see the gradual development of his psychology and his philosophy, his tremendous enthusiasm for his child guidance work and his activities in connection with criminology. We see him buffeted by the waves of adversity; we see him riding these waves in triumph. His lecture tours are set forth; his experiences in America, Holland and England are recounted; his last tour is sympathetically, almost pathetically described.

The book is essentially a biographical study of the man and not of the psychologist. When the time comes for a critical valuation of his philosophical and psychological contributions to be written this eulogy will be of real value to the author of that volume. It will be read now with interest and appreciation.

An Introduction to Psychology for Music Teachers: Three Lectures by TOBIAS MATTHAY. (Oxford University Press, 1939, pp. 66. 3s. 6d.)

This further series of lectures by Tobias Matthay, written first in 1919, is full of invaluable advice to music teachers, advice ranging from what to do and avoid when teaching beginners to guidance in the final rehearsing of a concert item. Such practical guidance, based on an experience which has revolutionized pianoforte playing, is of necessity a welcome and invaluable contribution to the literature of the subject. Equally welcome is the plea that the development of musical ability should be guided by a process of applied psychology.

It is to be regretted, however, that the psychology to which the music teacher is introduced is restricted to doctrines propounded either in the 'nineties or early in the present century. It is strange to read of Titchener, who died in 1927, as "one of the most advanced modern psychologists," and to find Dewey's *How We Think* described as "a comparatively recent book." Since the publication of this in 1910 and the death of William James in the same year voluminous contributions have been made both to general psychology and to that specifically related to teaching and to music. It is inconceivable that serious music teachers should not be acquainted with at least some of this material. J.M.

Superior Children : By JOHN E. BENTLEY. (London : George Allen and Unwin, Ltd., 1938, pp. xxiii+331.)

Dewey's remark that democracy has been unjust to the gifted child may be said to be the central theme of the author. In the first few chapters he discusses the characteristics of superior children, quoting from investigations to show how they are advanced as compared with normal children in physical, mental, social, and moral characteristics. After discussing the relative rôles of nature and nurture, the author considers special abilities and talents, with reference to the theories of Spearman and Thorndike. This is followed by a very sketchy chapter on precocity and one on the gifted girl.

Educational provisions for the instruction of superior children are then noted and discussed in turn. These are : (i) acceleration, (ii) enrichment of curriculum, (iii) adaptation of subject matter through individual instruction, (iv) homogeneous grouping into $x-y-z$ sections, and (v) special classes for the accelerated. This appears to be the most valuable section of the book. Inadequate chapters on the teacher of the superior child and on social adjustments follow, with a chapter on lives of some great men.

The general impression of the book is one of disappointment in spite of the importance of the subject-matter. There is a lack of continuity throughout, and at times the treatment is sketchy. A rearrangement of the material of the book would greatly enhance its value.

M.C.

Coeducation in its Historical and Theoretical Setting : By L. B. PEKIN. (London : The Hogarth Press, pp. 208. 7s. 6d. net.)

The author has, in previous books, castigated Public Schools and lauded Progressive Schools. In completing his trilogy he maintains his established reputation for lucid presentation of his subject, for trenchant criticism and for persuasive argument. In this volume he applies his skill to the still perplexing subject of coeducation, and from his own wide and varied experience presents the case for it with ability and enthusiasm. His historical survey is informative and his chapter on the position of coeducation in other countries is very interesting. He links the movement towards coeducation with both the nineteenth century development in women's education and the remarkable advance of what, for the lack of a more appropriate term, is usually called the New School movement. He is, perhaps, not quite as successful in his presentation of the psychological side of the question. The book, however, will be read with a deal of interest, particularly by those already convinced of the value of coeducation. It is doubtful if it will make many converts.

The Social Function of Science : By J. D. BERNAL. (London : Geo. Routledge and Sons, Ltd., pp. xvi+482. 12s. 6d. net.)

Professor Bernal has written an extremely important book which merits, and will undoubtedly receive, attention from very many readers. His main thesis is that science at present is being exploited, and is not being used sufficiently in the service of man. He amasses much evidence in support of the former idea, and makes many suggestions to increase the usefulness of science in the social sense. Part I deals with the topic What Science Does, and Part II with What Science Could Do. In each section the author deals fully with many subjects, has collected an enormous amount of material, criticises in no half-hearted fashion, but is ready with plans for remedying the present ills. The book will provide matter for interminable discussion, and should be certain of a wide circulation.

Towards Relationship : By FLORIDA SCOTT-MAXWELL. (The Bodley Head, London, pp. 253. 7s. 6d.)

This is a series of essays, chiefly about the relations of women to others. The topics include "Woman in Search of Herself," "Conflicts," "Mothers and Children," "Some Ways of Women," etc.

The writer makes acknowledgment to Jung, but there is little of value to the genuine student of psychology. Though the book is written in an interesting way there are far too many generalizations and highly speculative ideas.

Minor Mental Maladjustments in Normal People: By J. WALLACE WALLIN. (Duke University Press, pp. vi+298. \$3.00.)

This exceedingly interesting volume is a case book, intended chiefly for the use of students of psychology, education, etc. It is based upon the reports of individuals themselves, who were regarded by themselves and by the investigator as not abnormal. The reports cover such topics as fears and phobias, anxieties, worries, bashfulness, feelings of inferiority, obsessions, dreams, etc. They make extremely interesting reading, and are all the better for not being handled in a way which suggests selection or emphasis owing to a preconceived psychological theory.

The Heating, Ventilation, and Lighting of School Buildings: By W. D. SEYMOUR. (Oxford University Press, pp. xv+214. 12s. 6d. net.)

This is a book which, so far as we know, is unique. With the topics indicated by the title, it deals throughout in the light of researches as to ideal conditions, carried out by the National Institute of Industrial Psychology. It is published on behalf of the Association of Directors and Secretaries for Education, and no doubt the book will be widely used by members of that Association in the future planning of schools. The topics dealt with are treated in considerable detail, and from fundamental physiological and at times psychological points of view.

OTHER PUBLICATIONS RECEIVED.

A First Anthology of French Poetry: N. Cooper, pp. 75. (Oxford University Press; 1s. 3d.)

The Arithmetic of the Workshop: Bertram T. Gurr, pp. 142. (Macmillan's Senior School Series; 1s. 6d.)

The Rightway Arithmetic: Walter Clark and Frank Griffiths, pp. 119. (University of London Press; 3s. 6d.)

Macbeth: edited by Bernard Groom, pp. 191. (Oxford University Press; 2s.)

Grammar at Work, Part I: J. H. G. Grattan and others, pp. 116. (Longmans, Green; 1s. 9d.)

Stories to Tell in the Infant School: Roselin F. Cole, pp. 130. (Macmillan; 2s. 6d.)

Arnold, Poetry and Prose: E. K. Chambers, pp. 187. (Humphrey Milford; 3s. 6d.)

This England, 1485-1714: I. Tenen, pp. 278. (Macmillan; 3s. 6d.)

The World: Jasper H. Steinbridge, pp. 532. (Oxford University Press; 6s.)

Real Geography, Book I—North America; Book II—South America, Australia and New Zealand: J. Fairgrieve and Ernest Young. (George Philip and Son, pp. 100 each).

Modern Science, Biology, Book III: M. Munro, pp. 280. (Macmillan; 3s. 6d.)

Biology for Junior Forms: M. R. Lambert, pp. 320. (Macmillan; 3s.)

Biology for Senior Schools, Book III: M. R. Lambert, pp. 320. (Macmillan; 3s.)

A School Course of Biology: L. J. F. Brimble, pp. 469. (Macmillan; 6s.)

ALFRED ADLER, 1870-1937.

A CRITICAL APPRECIATION.

By MARY COLLINS.

THE most prominent of the secessionists from Freudian psychology are Jung and Adler, the founders of the schools of 'Analytical Psychology' and 'Individual Psychology' respectively. While both schools have met with interest and criticism, Adler's theories have of late years been under a cloud, at least among academic psychologists. This is not due to any lack of merit in his theories, as these were at first propounded. It is caused rather by the later recasting of his theories into popular language, to appeal to popular audiences and to wider circles of readers, a procedure which has often involved the sacrifice of scientific exactitude. How far this over-popularization can be accounted for by international conditions which affected him so adversely that he became an exile from his country, or whether it was the expression of an altruistic desire to make known his theories to all mankind, one can only conjecture.

Adler was born in Vienna in 1870. Incidents occurring during his childhood gave him a leaning towards medicine, in which he graduated in 1895. He set up practice as a general practitioner in the city of his birth, but in 1910 gave up his general practice to devote himself entirely to psycho-therapy. He joined the Freudian circle in 1900, and was a member of it for ten years, but parted company with Freud when their views became too incompatible, and when he found himself unable to agree with the main tenets of Freudian psychology. His new school of psychology, 'The Free Psycho-Analysts,' became in 1912, as his thought developed and his theories broadened, the school of 'Individual Psychology.'

While Adler cannot be regarded as a world figure like Freud, his contribution to psychology is very considerable, both on its own merits, and as an antidote to some of the more doubtful hypotheses of the Freudian school. His contribution lies chiefly in the two fields of medicine and education. His earlier works discuss, in the main, problems of medical interest, particularly the explanation and treatment of the neuroses and the psychoses, whereas his later works are pedagogical in theme, and prophylactic in practice, and have found a ready application in the fields of child guidance and mental hygiene.

One of Adler's earliest researches sets the keynote to his whole theory, and, in fact, marks the beginning of the formulation of his system of individual psychology. In 1907 he published an account of his researches on *The Study of Organ Inferiority and its Psychical Compensation*. In this study he lays down two propositions: first, that an inherited weakness or inferiority in any organ is the pre-condition of disease in that organ, and second, that organ inferiority affects both mental and spiritual development—a conception which he expounded more fully in his later work, *The Neurotic Constitution* which appeared in the German edition in 1909.

The presence of an organic weakness may cause attempts at compensation either in the organ itself or in some other organ by means of over-functioning; or *feelings* of inferiority—comparable to Janet's 'sentiment d'incomplétude—may be engendered which if at all extreme give rise to symptoms either physical, as in cases where enuresis develops as a result of urinary weakness, or mental, where literary achievement compensates for a frail physique or undesirable behaviour for poor intelligence. Compensation for inferiority may thus lead to achievement in some cases, to maladjustment in others.

This approach to the problem of neurosis is regarded by White in his introduction to *The Neurotic Constitution* as distinctive because it "approaches from the organic rather than from the functional side, and in this way affords a very valuable viewpoint because it tends to bring together the organicist and the functionalist, who have too long been separated by the misconception of irreconcilable differences between mind and body."¹ This doctrine has been of service in helping to bridge the gap between orthodox medicine and the so-called new psychology.

In later writings Adler realized that inherent organ weakness need not be the only cause of feelings of inferiority, but that early injuries may have exactly the same effect. Further, what is important for clinical workers and students of delinquency and crime, some children may be placed in such environments of strain and tension that their 'organs,' although normal, are inadequate for the demands made upon them, and they are to all intents and purposes in the same category as those with defective organs. Such are the *pampered* child and the *hated* child. This development of Adler's theory enables us to realize how his interests turned to the education of such children, with an aim solely preventive in character. He was anxious that their difficulties should be recognized early so that treatment might be begun without delay. Hence the slogan of 'Educate the Educators.' This side of Adler's

¹ pp. xix-xx.

work is undoubtedly of the highest value as any clinical worker would agree.

While it is claimed for Adler that his theories arose independently of any school of thought, and were the outcome of his own experiences and clinical practice, yet it must surely be admitted that he was largely the product of the environment and age in which he lived. The importance of the mental factor in illness was gradually being recognized, a fact which must have influenced Adler to no small degree. The work of Janet, of Breuer, and of Déjerine were all familiar to him, as he himself acknowledges. By the time, too, that Adler had commenced to practise medicine Freud had returned to Vienna after studying Charcot's methods in Paris, and the methods of the Nancy School. Adler, therefore, had the advantage of the seniority of Freud, and although the Freudian views met with considerable hostility, the fact that they were enunciated at all made the way easier for any who followed after. That Adler owed much of his inspiration to Freud can scarcely be challenged. Even if his theories arose largely out of his extensive clinical experience, as his followers contend, his contact with Freud and the Freudian circle helped him in the formulation of his ideas, and stimulated him to further research into the mental factor.

Other influences in his immediate environment include Nietzsche, Dostoevsky and Vaihinger. The work of Nietzsche with its emphasis on 'the will to power' and 'will to seem' influenced his conception of the 'masculine protest,' although both are probably indebted to Schopenhauer's 'will to live' for the original conception, while Dostoevsky the novelist, with his pictures of the neurotic in action, afforded Adler considerable insight into this condition. Adler regards Dostoevsky as 'having penetrated deeper than the science of psychology.'¹ To Vaihinger's *Philosophy of As If* Adler refers repeatedly, as confirming or elucidating certain points in his own theories. Particularly is he indebted to Vaihinger for his description of the historical course of ideas, from fiction to hypothesis, and later to dogma, which corresponds so well with Adler's stages in the development of the 'guiding fiction' of the neurotic.

From Freud, Adler departs radically on many of his main tenets. One is the minor character of the rôle which he ascribes to the sex factor and the emphasis which he places on the egoistic impulses which Freud has been challenged with minimizing. His conception of the 'masculine protest' with its emphasis on the self-assertive impulse, reduces the rôle of sex very significantly.

¹*Individual Psychology*, p. 290.

Thus the Oedipus complex is explained as the desire of the son to dominate his mother, while infantile sex wishes reveal the struggle to outgrow childhood's limitations. Adler, therefore, contends that sexuality is a manifestation or a symbol of something much more fundamental and deeper, namely, the desire for power.

Another important point of difference between Freud and Adler concerns the rôle of the libido which Freud regards as being the dominant motive force in every neurosis. Adler, on the contrary, maintains that the goal towards which the individual is striving is of the first importance. Thus Adler once more rejects Freud's over-emphasis on sex, which falls into its own place only when viewed in relation to the individual's 'style of life.'

While one may not regard Adler's views as any more tenable than Freud's, his departure from the narrow interpretations of the Freudian School is an important step, and a contribution to psychology which should not be overlooked. Further, it is one of the merits of his psychopathology that he shows how the lust for power can destroy the social efficiency of the individual, as well as wreck his peace of mind and happiness. Whether Adler's theory in all its ramifications gives a complete picture of the psychogenesis of a neurosis is a more debatable point.

Adler is in agreement, however, with Freud in stressing the importance of the early years, although for a different reason. The child in his early years forms a 'schema' or a 'pattern' or a 'style' of life which influences all his subsequent behaviour. To each of the three great problems of life to which the child must become adjusted, that of social and community life, that of occupation, and that of love—called alliteratively, society, subsistence and sex—his life pattern determines his reactions and attitudes. As his first adjustment is to his social environment which begins in the child's own family circle, the importance of the early years can be realized, for the pattern then formed will, Adler thought, determine the child's reactions throughout life. Thus the pampered child receives a prominence which is unmerited, and later expects always to be the centre of attention: the hated child's goal in life is escape to a safe distance; the eldest child adopts a conservative attitude; the second child is always striving to surpass. The only girl in a family of boys or the only boy among girls, the only child, the youngest child, are all born into family situations which mould their attitudes to life, and which are instrumental in determining the schema or life pattern developed.

The neurotic, as indeed the delinquent and the criminal, are those whose life patterns are socially useless. The task then of the individual

psychologist is to reveal to such an individual that his 'inferiority complex,' and his attempts to attain superiority by compensation, are the causes of his troubles, and so to lead him by a process of re-education to modes of thought and actions of more practical use and social acceptability. Once the pattern of life has been formulated it cannot be altered, although it can be diverted into other and more satisfactory channels. This goal of social adaptation as the main therapeutic principle shows a marked deviation from the Freudian School with its exploration of the unconscious and its emphasis on the disentangling of fixations.

On the therapeutic side, childish memories are utilized, not for 'traumatic' experiences, but to ascertain what incidents have been treasured over the years. The events which the individual has *chosen* to remember are significant. Dream analysis is also used, but as a clue to the individual's life pattern, for the dream portrays a 'trial solution' of a real problem occurring in the future. The effect of the dream is also of importance, for its purpose is to reinforce the individual's life pattern against the demands of common sense. Thus a student faced with an examination whose life pattern is "running away," may dream that he is fighting in a war or standing before an abyss so that he must run back if he is not to fall in. Thus the fear aroused in the dream reinforces his own particular life pattern.

Two of Freud's main mechanisms, resistance and transference, when met with are interpreted on non-Freudian lines. Resistance is not, as in the Freudian view, an unconscious opposition to the emergence of repressed wishes, but a defensive mechanism against the treatment itself. The individual fears that if he is cured he may undertake tasks in which he would be sure to fail. Transference has no place in the Adlerian treatment. If it does occur, it is regarded as a hindrance, and an attempt on the part of the patient to get the better of the physician.

In his earlier works, *Organ Inferiority*, *The Neurotic Constitution*, and *Individual Psychology*, Adler is at his best. But in his later works, such as *What Life Should Mean to You*, Adler departs from the attitude of the research worker, and becomes more and more a universal guide, philosopher and friend. His theories gradually lose their scientific character as he becomes the exponent of the new gospel of 'social interest' which was to be the panacea for all ills, individual, national and international. It is unfortunate that Adler departed so radically from his earlier scientific standpoint—although he may have been the victim of circumstances—for one is tempted to toy with the idea that his researches might have led him to new fields of discovery of intrinsic worth. As it happened, his doctrines became truly 'popular,' and almost naive in their exposition.

Adler, nevertheless, has made a distinct impression in educational spheres, and his outlook and attitude to delinquency and minor maladjustments have permeated the fields of child guidance and mental hygiene. The recent emphasis on preventive work in neurosis and delinquency may be largely due to Adler's insistency on this point. Further, Adler's constant advocacy of the need for the teacher to have an understanding of the child mind and any deviations therefrom, so that the detection of potential delinquents and potential neurotics may be facilitated, deserves every encouragement and praise.

Adler's teaching is largely concerned with the upbringing of the normal child and his emphasis on 'normality' as distinct from abnormality has had the effect of interesting all those who have children in their care, educationists, parents, ministers, and social workers. The recognition, too, of the prevalence of 'inferiority feelings' in the everyday situations of life evoked a ready response.

It is unfortunate that Adler's theories, because of their simplicity and ease of apprehension, have attracted so many charlatans and would-be psychologists who by their lack of discrimination and misplaced zeal have often obscured the merits his psychology possesses; for although Adler may not rank as one of the great psychologists, his contribution to psychology is by no means negligible.

PRELIMINARY RESULTS OF CAMBRIDGE SURVEY OF EVACUATED CHILDREN.

BY AYMERIC STRAKER AND ROBERT H. THOULESS.

- I.—*Scope and methods of enquiry.*
- II.—*Assessment of general satisfactoriness or unsatisfactoriness of the foster-parent—child relationship.*
- III.—*Relationship of satisfactoriness of adjustment to age of child.*
- IV.—*Relationship of satisfactoriness of adjustment to age of foster-mother.*
- V.—*Relationship of satisfactoriness of adjustment to frequency of change of billet and to frequency of visits from parents.*
- VI.—*Relation of satisfactoriness of adjustment to presence of other children in foster-home.*
- VII.—*Relationship of intelligence of child to satisfactoriness of adjustment.*
- VIII.—*Special difficulties.*
- IX.—*Children returned to Tottenham.*
- X.—*Practical proposals.*
- XI.—*Work in progress.*
- XII.—*Summary of results.*
- Appendix.*

I.—SCOPE AND METHODS OF ENQUIRY.

THIS enquiry was undertaken by an *ad hoc* research committee presided over by Dr. Susan Isaacs working under the direction of a larger consultative committee. The committees were made up of administrative officers connected with evacuated children, of social workers, sociologists, psychologists, teachers, psychotherapists, etc. They were drawn from Cambridge and from educational institutions evacuated from London (London School of Economics, Bedford College and the Institute of Education).

The organization of the investigation was carried out until Christmas, 1939, by Miss Margery Fry. The secretarial work of the research committee was done by Miss Clement Brown of the London School of Economics. The filling up of enquiry forms about foster homes was done by the Friendly Visitors of Cambridge under the direction of Mrs. Adrian, and the committee is indebted to them for their co-operation. Other members of the committee have performed particular parts of the investigation ; particularly heavy work in the statistical and other parts

of the enquiry was done by Mr. Bullen of the Downhill Secondary School, Tottenham.

The object of the enquiry was to obtain as much information as possible about the main consequences of evacuation, particularly those affecting the children themselves. In particular the Committee wished to find out how far a satisfactory relationship had been established between the evacuated children and their foster-parents, and to investigate the causes of such unsatisfactory adaptations as were found. The practical aim of the investigation was to provide a factual basis for planning the future of the evacuation scheme. A set of recommendations based on the results of the investigation has already been sent to the Minister of Health (reported in *The Times* 27/3/40).

It was at first intended to make a general survey of the whole number of 3,000 evacuated children in Cambridge, afterwards making a more detailed study of a sample randomly selected out of this total and also of outstandingly good and bad cases of adaptation to evacuation conditions. In view, however, of the urgency of the practical problem, it was felt that this programme was too ambitious and the enquiry so far conducted has been restricted to the children evacuated from the Tottenham area only, of whom about 300 had remained in Cambridge at the time of the enquiry (i.e., on December 1st, 1939).

Information about the children was obtained from four sources: (1) from the entries in an enquiry card filled in by the Friendly Visitors who had made a number of official visits of enquiry to the child's foster-home (reproduced in Appendix), (2) from the entries in a similar (but not identical) card of enquiry filled in by the child's teachers, (3) from two essays done by each child on 'Things I like in Cambridge,' and 'Things I miss in Cambridge,' and (4) from information received from two teachers who were on the Committee (Mr. Mercer and Mr. Bullen) who had personal knowledge of most of the children.

II.—ASSESSMENT OF GENERAL SATISFACTORINESS OR UNSATISFACTORINESS OF THE FOSTER-PARENT—CHILD RELATIONSHIP.

From the information obtained by the methods detailed in the above paragraph, an assessment of the general satisfactoriness or unsatisfactoriness of the relationship between the child and the foster-parent was made by Dr. Isaacs and Mr. Bullen in consultation. A five-point scale was used, ranging from +2 for a relationship in which the children appeared to be as contented as could be expected, to -2 for children who appeared to be outstandingly unhappy in their new circumstances.

The results of this classification are shown in Table I :

TABLE I.

Assessment	+2	+1	0	-1	-2	
Boys	54	57	20	9	5	145
Girls	63	59	26	6	5	159
Totals	117	116	46	15	10	304

The first conclusion to be drawn from this table is that, so far as it can be judged from the nature of the relationship between child and foster-parent, the evacuation of these children to Cambridge homes has been, on the whole, a success. Only twenty-five of the children (about 8 per cent) appear to have developed an unsatisfactory relationship with their foster-parents, whereas in 233 cases the relationship seems to be more or less satisfactory.

It must, of course, be recognized that this enquiry is concerned only with part of the problem of the success of the evacuation policy. No attempt has been made to assess the extent to which foster-mothers have found themselves able without undue strain to support the burden of the additional work which is caused in many cases by the presence of additional children.

Secondly, it is apparent that there is no difference between the girls and the boys with respect to the satisfactoriness of adjustment. The slight differences between the proportions of girls and boys in the different classes in Table I are only such as are to be expected by the chances of sampling. This impression is confirmed by statistical examination of the Table. If the χ^2 test for significance is applied, it is found that the deviations in the sex distributions are only such as would be found as often as not by the chances of sampling. Satisfactoriness of adjustment to billeting conditions is, therefore, the same for boys as for girls.

III.—RELATIONSHIP OF SATISFACTORINESS OF ADJUSTMENT TO AGE OF CHILD.

When, however, we study the relationship of the age of the children to the satisfactoriness or unsatisfactoriness of the foster-parent—child relationship, more positive results emerge. The distribution of the different age-groups in the five classes in which the assessments of this relationship are placed is shown in Table II.

TABLE II.

<i>Age.</i>	<i>Total Number.</i>	+2	+1	0	-1	-2	% -
5	12	3	5	4	—	—	0
6	12	7	5	—	—	—	0
7	20	12	4	3	—	1	5
8	30	12	12	6	—	—	0
9	26	11	10	5	—	—	0
10	26	9	13	3	—	1	4
11	25	10	6	8	1	—	4
12	32	16	13	1	2	—	6
13	53	14	25	7	3	4	13
14	33	12	9	4	4	4	24
15	22	8	5	4	5	—	23
Totals . .	291	114	107	45	15	10	8½

The general indications of this table can best be seen by a study of the last column, which shows the percentage of children who are classified as either -1 or -2. The most striking feature of the table is the sharp rise in this percentage at age 13 (i.e., for those children who on December 1st, 1939, were 13 on their last birthday) and which is continued for the next two age groups. This indicates a greater difficulty in making a satisfactory adjustment to billeting conditions for the older children.

The information for the 5 to 7 group is relatively meagre. They did not write the essays which were found very useful in the assessment of the older children and the teachers on the research committee knew relatively little about the youngest children. It is, therefore, very likely that the assessments are not particularly reliable for these children, and the table is not to be considered as providing very good evidence that adjustment to billeting conditions is as satisfactory at this age as for the 8 to 12 age group.

The statistical significance of the increase of unsatisfactoriness at 13 years has been examined by various methods. All give a similar result and leave no doubt that the rise is significant. We may, for example, make a direct comparison between the age groups 8 to 12 and from 13 to 15 (omitting the youngest group as of doubtful validity). We find only

four cases of unsatisfactory adjustment (assessed -1 or -2) in the first group and 135 that were assessed $+2$, $+1$, or 0 , whereas in the higher age group there were twenty cases of unsatisfactory adjustment against 88 that were, on the whole, not unsatisfactory. If we treat these figures as a four-fold table and test their significance in the usual way, we find that $\chi = 15.1$, and that the probability of a value as large as this occurring by the chances of sampling is less than $.0001$. The deviation from expectation in the largest age group is, therefore, unquestionably significant and we must conclude that difficulty in adjustment to the billeting situation arises predominantly with children of 13 years and over.

Any explanation that may be given of this fact must, of course, be a guess; the enquiry itself points only to the fact and provides no data for its explanation. It may be a result of the increased restlessness of the adolescent, or of the greater difficulty in forming emotional ties with older people at that age. A contributory factor may be the greater expense of feeding older children.

IV.—RELATIONSHIP OF SATISFACTORINESS OF ADJUSTMENT TO AGE OF FOSTER-MOTHER.

A minor question which was asked was as to whether the age of the foster-mother made any difference to the satisfactoriness of the child's adjustment. The figures obtained are shown in Table III. There are no significant deviations in this table from the proportions expected in each class on the assumption that foster-mothers of all ages establish on the average equally satisfactory relations with children in their charge. A cursory examination of the table shows the fact that no children with an unsatisfactory relationship were to be found in the homes of foster-mothers of more than sixty years of age. This difference is not, however, significant. A separate comparison between the foster-mothers of over sixty and those under sixty shows that the deviation from expectation

TABLE III.

<i>Age of Foster-mother.</i>	<i>Assessments of satisfactoriness of relationship.</i>					<i>Totals.</i>
	$+2$	$+1$	0	-1	-2	
Under 40	47	46	17	6	6	122
40-60	46	26	12	7	2	93
Over 60	12	11	4	0	0	27
Totals	105	83	33	13	8	242

is only such as might occur by the chances of sampling once in four times. There is no reason, therefore, for supposing that the apparent superiority of the oldest foster-mothers is anything but accidental. All that can safely be concluded from these figures is that in no age group are the foster-mothers appreciably less successful than in any other age group.¹

V.—RELATIONSHIP OF SATISFACTORINESS OF ADJUSTMENT TO FREQUENCY OF CHANGE OF BILLET AND TO FREQUENCY OF VISITS FROM PARENTS.

Some children have remained all the time in the same billet, others have changed their billets frequently. The question arises whether a primary cause of the frequent change of billet is some factor in these children themselves which makes them unable to form a satisfactory relationship with any foster-parent. If this were so, we should expect to find that those children who had changed their billets frequently were, on the whole, assessed low in the scale for satisfactoriness of relationship between foster-mother and child. This does not appear to be the case.

TABLE IV.

	+2	+1	0	-1	-2	Totals.
No change of billet	52	50	15	5	3	125
One or more changes.	57	55	26	10	7	155
Totals	109	105	41	15	10	280

The figures are shown in Table IV. It can be seen there that the number of unsatisfactory adjustments (-1 or -2) amongst those who had changed their billets was 17 out of 155, while amongst those who had remained in the same billet the number was 8 out of 125. There is a small excess of unsatisfactory adjustments amongst those who have had changes of billet, but the difference is insignificant. If we treat the figures just given as a four-fold table with one degree of freedom, we find (using Yates's correction for continuity) that χ^2 is 1.3 and that the likelihood of such a value arising by the chances of sampling is about 1 in 4. The apparent excess in the children whose billets have been changed is, therefore, not significant, and we may conclude that the changes of billet that take place are predominantly produced by causes that do not render it less

¹ In Table III and elsewhere, it may be noticed by the critical reader that the totals do not agree exactly with those shown in Table I. Where this is the case, it is caused by the fact that in the detailed enquiries, it was found that some of the cards had been imperfectly filled in and did not contain the information required. It was, therefore, necessary to omit these cases.

probable that the child will finally settle down happily in a suitable billet. There are, no doubt, some children whose peculiarities of character are such that they cannot be billeted satisfactorily with any foster-parents, but such peculiarities of character do not seem to be a principal or even a frequent cause of the changing of billets.

Another factor which has been sometimes stated to be a cause of inability of a child to settle down happily in his billet is the upsetting effect of visits from the real parents. Our enquiry failed to produce any evidence in support of this view. The figures are shown in Table V for

TABLE V.

<i>Frequency of Parents' Visits.</i>	+2	+1	0	-1	-2	<i>Total.</i>
None	2	1	1	4	0	8
Occasional	44	58	23	7	5	137
Frequent	33	35	12	0	1	81
Totals	79	94	36	11	6	226

the 226 children for whom information as to parents' visits was available. It will be seen that 4 out of 8 children who had had no visits from parents were unsatisfactorily adjusted, 12 out of 137 of those with occasional visits from parents, and only 1 out of 81 amongst those with frequent visits from parents. The total number of cases with no visits from parents is too small for any reliance to be attached to it, but if we compare the figures for occasional visits from parents with those for frequent visits, there is a significant deficiency of -2 and -1 cases amongst those children with frequent visits. Treated as a 2×2 table, these two classes give a value of 3.8 for χ^2 with odds of 20 : 1 against such a value occurring by the mere chances of sampling. The significance would, of course, have been greater if the 'no visits' class had been included with the 'occasional visits' class.

It would probably be rash to conclude that frequent visits from parents are favourable to the formation of a happy relationship between children and foster-parents. There are other possible explanations of the figures, as, for example, that where parents visit their children frequently, those children who are unhappy in their foster-homes are more likely to be taken home. However that may be, the figures given appear to contradict the common opinion that frequent visits of the parents are unfavourable to the satisfactory settling of the child in his foster-home.

VI.—RELATION OF SATISFACTORINESS OF ADJUSTMENT TO PRESENCE OF OTHER CHILDREN IN FOSTER-HOME.

The enquiry into this important question was somewhat hampered by two deficiencies in the original card of enquiry. The information required was obtained in two sections which appeared as follows :

NUMBER OF CHILDREN IN FOSTER-FAMILY
(including all foster and own children).

(Enter number).

<i>Under 5 years.</i>	<i>5 to 14.</i>	<i>Over 14 years.</i>

and

BROTHERS AND SISTERS BILLETED IN SAME HOUSEHOLD.

(Tick under number).

<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>More than 4.</i>

It was only at a late stage of the enquiry that we realized that these questions failed to make the important discrimination between the presence in the billet of other evacuated children and of the children of the foster-parents. The information was scattered through the cards since the address of all the evacuated children in that district was known, but it was in a relatively unavailable form. It was only by the heavy labour of going through all these addresses that Mr. Bullen remedied this deficiency of information.

It was also unfortunate that the question about siblings in the same household did not include a space for 0. No entry in this section might mean either that there were no siblings in the household or that there was no information. Again this deficiency was remedied by a careful cross-check of siblings' addresses by Mr. Bullen.

When the information obtained directly from the cards was supplemented in this way, the figures shown in Table VI emerged. In this Table, S+ means siblings of evacuated child were present in the same household, S- means that no siblings were there, E+ and E- refer similarly to other evacuees and C+ and C- to the presence or absence of other Cambridge children. Since (unlike the previous details of the enquiry) there seemed to be a difference between boys and girls in this respect the figures are given separately for boys and girls, the figures for boys being given first and those for girls within brackets.

TABLE VI.

<i>Other Children in Billet.</i>	+2	+1	0	-1	-2	<i>Totals.</i>
S+ E+ C+	4 (5)	4 (4)	0 (0)	0 (0)	0 (1)	8 (10)
S+ E+ C-	3 (5)	2 (5)	0 (4)	0 (0)	0 (0)	5 (14)
S+ E- C+	5 (8)	10 (14)	2 (5)	0 (1)	1 (0)	18 (28)
S+ E- C-	3 (7)	3 (6)	0 (1)	0 (0)	0 (0)	6 (14)
S- E+ C+	5 (3)	4 (7)	2 (4)	2 (0)	0 (0)	13 (14)
S- E+ C-	7 (9)	5 (6)	1 (2)	3 (2)	0 (0)	16 (19)
S- E- C+	8 (9)	12 (2)	8 (3)	3 (1)	0 (1)	31 (16)
S- E- C-	12 (5)	11 (8)	2 (2)	0 (2)	0 (3)	25 (20)
Totals	47 (51)	51 (52)	15 (21)	8 (6)	1 (5)	122 (135)

The most convenient way of examining the implications of this table is to split it up in various ways, as, for example, into the S+ and S- classes in order to discover whether presence or absence of siblings is favourable to success in adjustment to the foster-home. This is done by adding the first four (S+) rows and comparing this with the total for the last four (S-) rows. A further simplification may be introduced without serious loss of information by reducing the five classes of degrees of satisfactoriness to two: those unsatisfactorily adjusted (-2 and -1) and the others (0, +1, and +2). If this is done for the Sw, S- classes, we get Table VII:

TABLE VII.

	<i>Satisfactorily Adjusted.</i>	<i>Not satisfactorily Adjusted.</i>	<i>Totals.</i>
Siblings in billet	36 (64)	1 (2)	37 (66)
No siblings in billet.....	77 (60)	8 (9)	85 (69)
Totals	113 (124)	9 (11)	122 (135)

It appears from Table VII that 12 per cent of the boys and 13 per cent of the girls fail to adjust themselves happily in their billets if they have no brothers or sisters with them in their billets while only 3 per cent in each case fail to make this adjustment if brothers or sisters are living with them. In order to discover whether this is a real effect we may

combine the figures for boys and girls and test the whole 2×2 table for significance in the usual way. It is found that χ^2 is 4.58, and that P is less than .05. We may, therefore, conclude that the discrepancy of the figures is not accidental, but that there is a real advantage for harmonious adjustment in having brothers or sisters of the evacuated child in the same billet.

The other outstanding feature of the table is the effect of complete isolation from other children. If we compare the (S -, E -, C -) class with all the others we find 5/30 (or 25 per cent) cases of unsatisfactory adjustment amongst the isolated girls, as compared with 6/115 (or 5 per cent) amongst those with other children in the billet. Amongst boys the figures are different; there are no cases of unsatisfactory adjustment amongst the 25 boys living without other children, but 9/97 amongst the remaining boys. The better adjustment of the girls when they are with other children is significant ($\chi^2=6.35$, $P=.01$). The apparent superiority of the boys when they are alone is not significant and may easily be due to an accident of sampling; the figures make it clear, however, that the boys' adjustment to billeting conditions does not suffer from isolation from other children as does that of the girls. The conclusion seems to be justified that boys can be billeted successfully apart from other children, but that for girls this is a condition unfavourable to a satisfactory adjustment, although both boys and girls will be more likely to settle down happily if their own brothers and sisters are in the same billet.

Separate consideration of the effect of fellow evacuees and of Cambridge children is less important and may be considered shortly. Again there is a difference between the boys and girls. If we compare the whole E+ group with the whole E - and the whole C+ with the C - both for girls and boys, we find that apparently the presence of other Cambridge children and of fellow evacuees is favourable to the formation of a satisfactory adjustment in the girls, but unfavourable in the boys. If, however, in these comparisons, we omit the (S -, E -, C -) class (that in which no other children were present in the billet), these effects of the presence of fellow evacuees and of Cambridge children disappear or become insignificant. The presence of fellow evacuees and of Cambridge children appears, therefore, to have no effect on satisfactoriness of adjustment, except that already pointed out, that either is better for the girls than complete isolation from other children, but not for the boys.

The information as to the effect of the number of children in the family into which the child was billeted is summarized for boys and girls together in Table VIII.

TABLE VIII.

<i>Number of Children in Family.</i>	+2, +1, & 0	-1 & -2.	<i>Total.</i>	<i>Per cent Unsatis- factory.</i>
One	32	4	36	11
Two	71	1	72	1½
Three	69	5	74	7
Four or more	75	9	84	11
Totals	247	19	266	7

If the indications of the percentages in the last column could be taken at their face value, it would appear that the optimal size of family for the evacuee was two, and that it was less satisfactory if he was put with a single child or with a large family. The last finding seems very likely since discomfort through overcrowding may often be the result of having too many children in the house. The table cannot, however, be regarded as evidence since when it is tested for significance it is found that $\chi^2=5.98$ and that (with three degrees of freedom) this value may occur by chance alone about once in ten times. The discrepancy from uniform distribution of unsatisfactory adjustments through the different family sizes is not, therefore, large enough to provide evidence that family size does affect ease of adjustment, although it is sufficiently suggestive to be worth studying with larger numbers.

VII.—RELATIONSHIP OF INTELLIGENCE OF CHILD TO SATISFACTORINESS OF ADJUSTMENT.

The intelligence quotients of the children who showed, on the whole, an unsatisfactory adjustment (i.e., those ranked as -2 or -1 in the assessment of the satisfactoriness of the foster-parent—child relationship) were compared with those of a control group equivalent in age and sex whose relationship was satisfactory (all but two having been assessed as +2, the other two as +1). These two groups will be here referred to as the A- group and the A+ group respectively.

Of the 25 A- children mentioned in Table II, only 20 were available for intelligence testing, 11 girls and 9 boys. The assessment of I.Q. was made by means of the Terman-Merrill Revised Stanford Scale by Mrs. Bathurst. The age range in each group was 11; 11—15; 11, the mean age being 14; 3.

The mean I.Q. of the 20 children of the A - group was found to be 117.85 (with standard deviation 12.6), that of the 20 children of the control A+ group was 113.6 (with standard deviation 12.5). At first sight, this seems to show the unexpected result that the children less well adapted to the billeting situation were more intelligent than the others. This would, however, be an unwarranted conclusion since the difference is not significant. The difference of 4.25 in favour of the less well adjusted group has a standard error of 3.96. A difference as large as this would occur about once in three times by chance alone if there were no real difference in intelligence. There is, therefore, no evidence of any difference in intelligence between the children who have failed and those who have succeeded in making a satisfactory adjustment to the billeting situation. This conclusion may be stated in the more positive form that, if there is any difference in intelligence between the satisfactorily and unsatisfactorily adjusted children, this difference is small; it is very unlikely to exceed 8 points of I.Q.

The investigator also made a personality assessment by judging the behaviour of the children in the test situation (with the T-M Test, and also with two performance tests). There was also no significant difference between the two groups with respect to these personality ratings, and it may be concluded that the temperamental factors measured in the personality rating were also of no importance in determining the success of adjustment to the billeting situation.

VIII.—SPECIAL DIFFICULTIES.

Of 271 cases (130 boys and 141 girls), 179 were not reported as having any of the special difficulties asked about on the Enquiry Card (Appendix). There were thus 92 cases included in the Table on next page (46 boys and 46 girls).

As a preliminary to producing order in the results, the difficulties were divided into four syndromes: A (overtly or actively anxious), B (aggressive), C (passively anxious), and D (delinquent). Table IX shows the number of times each difficulty occurred.

The first point of interest is the sex incidence of the different causes of complaint. It is clear to inspection that there is no difference in the extent to which the complaints in syndrome B as a whole are made about boys and girls although there is a significant excess of complaints of temper amongst the girls. In syndrome D also the apparent excess of difficulties amongst the boys is found not to be significant ($\chi^2=1.6$, $P=.2$). The excess of difficulties amongst boys in syndrome A and amongst girls in

syndrome C are both significant ($\chi^2=5.6$ and 7.36 respectively). The difficulties amongst boys seem to be predominantly those of active anxiety, while those amongst girls are of more passive reactions to anxiety.

TABLE IX.

<i>Syndrome A.</i>	<i>Boys.</i>	<i>Girls.</i>	<i>Total.</i>	<i>Syndrome C.</i>	<i>Boys.</i>	<i>Girls.</i>	<i>Total.</i>
Excitable	25	14	39	Shy	2	21	23
Fidgets	13	9	22	Homesick	2	4	6
Nervous move- ments	12	8	20	Food fads	4	0	4
	50	31	81	Cries	0	1	1
				Drowsy	1	0	1
				Nightmares....	0	1	1
				Fears	0	1	1
<i>Syndrome B.</i>					9	28	37
Temper	2	12	14				
Disobeys	6	2	8				
Destructive	3	0	3	<i>Syndrome D.</i>			
Fights	2	1	3	Lies	9	5	14
Bad Language ..	1	0	1	Steals	5	3	8
Cruel	1	0	1				
	15	15	30		14	8	22

More important, however, for our present purpose is the question of how these different sets of difficulties are related to billeting difficulties as measured by the assessment of satisfactoriness of the child—foster-parent relationship. The information on this point is summarized in Table X.

TABLE X.

<i>Syndrome.</i>	<i>Child-foster-parent relation assessment.</i>				<i>Percentage of —ve Assessments.</i>
	<i>+2 & +1</i>	<i>0</i>	<i>—1 & —2</i>	<i>Total.</i>	
A+	42	7	5	54	9
A—	163	35	19	217	9
B+	12	6	7	25	28
B—	193	36	17	246	7
C+	21	6	4	31	13
C—	184	36	20	240	9
D+	6	7	4	17	23½
D—	199	35	20	254	8
Totals	205	42	24	271	

In Table X, it is obvious to inspection that the presence of syndrome A is not associated with difficulty in adjustment in the foster-home. The small observed excess of difficult adjustments when syndrome C is present is also not significant ($\chi^2=1.3$, $P=.5$). On the other hand, the presence of syndromes B and D both cause a large and significant excess of difficult adjustments ($\chi^2=15$ and 16 respectively, $P<.01$ in both cases). We may conclude that the kinds of behaviour difficulties that cause unsatisfactory relationships between children and their foster-parents are those of the aggressive and delinquent types.

IX.—CHILDREN RETURNED TO TOTTENHAM.

An enquiry was also made about 29 boys and 40 girls who had returned from Cambridge to Tottenham. The proportion of boys to girls is not significantly different from that of the children remaining in Cambridge, nor is the distribution of ages.

From discussion with the mother and from other information, the social worker making the enquiry inferred what were the reasons for the child being brought home. Difficulty with the foster-parents was the most common reason, being given in 16 (23 per cent) of the cases. Money difficulties came next, being found in 15 (21½ per cent) of the cases. Desire to have the children at home was found in 11 (16 per cent), and desire of the children to be at home was expressed in the same number of cases. Illness of the child was given as a reason 10 times (14½ per cent). Unwillingness of Cambridge foster-mother to keep children because she would be better paid for other lodgers was given in 8 (11½ per cent) cases. The real parent's jealousy of the foster-parent was inferred in 3 (4½ per cent) of the cases.

The above reasons were distributed fairly equally between the sexes. Objection to the housing or sleeping accommodation at Cambridge was found as a reason amongst six of the girls and none of the boys. Lack of occupation was also given as a reason for return amongst five girls and no boys; missing of friends was a reason for six girls and for only one boy.

All other reasons given for returning are infrequent. The fact that there had been no air-raids was mentioned only in three cases. In eight of the returned families there was disagreement as to whether the children should be brought home. In all of these cases it was the father who opposed the return.

Twenty-one of the twenty-nine returned boys and thirty-seven of the forty returned girls are reported to have settled down at home happily. Three girls and six boys are reported to show evidence of war fears.

Asked about their opinion of the general plan of evacuation, forty of the forty-nine parents were, on the whole, in favour of it, four were against it and five expressed no views. Twenty of the forty in favour expressed various qualifications, seven were in favour only for young children, seven only to a suitable billet, three wanted evacuation only when danger was imminent, and two only to a really safe area (doubt as to whether Cambridge was a sufficiently safe area has been expressed by the parents of evacuated children).

X.—PRACTICAL PROPOSALS.

The practical aim of the research—to provide data for guidance in future evacuation schemes—has been kept constantly in mind. On March 18th, 1940, a series of practical recommendations was drawn up. Particular points arising out of the survey were the necessity for keeping family groups together as far as possible, the encouragement and facilitation of parents' visits, the provision of trained social workers for reception areas, and the provision of three types of hostel, including a home for difficult children who are unsuitable for foster-homes. This last class is estimated to be at least 2 per cent of the evacuated children.

XI.—WORK IN PROGRESS.

The investigation so far reported is concerned only with those children who have been evacuated from Tottenham to Cambridge. The Tottenham children cannot be regarded as a completely representative sample of the children evacuated from London since it does not include evacuated children from homes of extreme poverty. It is proposed, therefore, to make a further investigation of a somewhat larger number of children who have been evacuated to Cambridge from Islington. This investigation has now been started by Miss K. Davies, whose services have been loaned by the Mental Health Emergency Committee (to whom the survey is also indebted for the services of the two social workers who carried out the part of the investigation reported in Section IX).

XII.—SUMMARY OF RESULTS.

(1) On information obtained from enquiry cards and other sources, the satisfactoriness of the relationship of each child to his foster-parent was assessed on a five-point scale. This relationship was found to be, on the whole, satisfactory, but less so for the older children.

(2) The age of the foster-mother did not seem to affect the satisfactoriness of this adjustment.

(3) It seemed not to be adversely affected by frequent visits from the real parent.

(4) The presence of the child's own brothers and sisters in the billet was found to be very favourable to a satisfactory adjustment.

(5) The presence of other children (Cambridge children or evacuees) was found to be relatively unimportant to the boys, but more favourable to a good adjustment for the girls than was complete isolation from other children.

(6) Aggressiveness and delinquency appeared to be the types of behaviour trouble most disturbing to this adjustment.

(7) Difference of I.Q. appeared to be of no importance in determining the satisfactoriness of adjustment to the conditions of billeting.

APPENDIX.

CARD USED FOR ENQUIRY AMONG FRIENDLY VISITORS.

STRICTLY CONFIDENTIAL.

No names will be divulged.

(OFFICE USE ONLY.) Number

Ward

No. of Rooms

Foster-parent (householder).

Surname. Initials. Mr., Mrs., Miss.

Address.

Occupation of Householder.

Estimated Age of Foster-mother.

Under 40; 40 to 60; Over 60.

Number of Children in Foster Family (including all foster and own children).

Under 5 years; 5 to 14; Over 14 years.

Has there been a change of billet due to the child's difficulties?

Foster Child.

Surname. First Name. Age. Boy. Girl.

London Address of Child.

Date of Arrival in Cambridge.

Name of London School.

Name of Cambridge School.

Number of Brothers and Sisters in Cambridge.

Number of Brothers and Sisters Billeted in same Household.

Sleeping Conditions. Own room or number shared with; Own bed or number shared with.

1. What do the foster-parents feel about the billeting money?
2. Have there been any difficulties about the child's clothes?
3. Have the child's own parents supplied any clothes since his arrival?
4. What does the foster-mother feel about the extra work?
5. What is the foster-mother's attitude towards having the child?
Likes. Tolerates. Is Dissatisfied.
6. Is the foster-mother willing to continue having the child?
7. If not, for what reasons?
8. Is the foster-father willing to continue having the child?
9. If not, for what reasons?
10. How does the child fit into the family? Well. Fairly. Badly.
11. Is the child happy?
12. Has he shown any anxiety about his parents?
13. Parents' visits to their child. Often. Occasional. Never.
14. Comments of foster-parents about such visits.
15. Effects of visits on child.
16. Child's relations with other children. Friendly. Quarrelsome.
Child plays with others. Generally. Seldom.

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17. Health. Good. Fair. Poor. Skin Trouble. Hair Nits. Body Lice.
18. Is the child praised for any specially good qualities?
19. Have there been any special difficulties.

(*Note.*—The following list includes all sorts of complaints that have been made from time to time about different children. Visitors are asked to tick any that may have been mentioned about this particular child.)

Cries often. Sleepless. Drowsy. Lethargic. Nightmares. Special fears. Shy. Homesick. Food fads. Greedy. Bad table manners. Bad language. Sex talk. Sex behaviour. Steals. Cruel. Destructive. Disobeys. Lies. Fights and quarrels. Loses temper. Truants or wanders. Noisy. Excitable.

Soils himself (bowel movements).

	<i>Often.</i>	<i>Sometimes.</i>
Day		
Night.....		

Wets himself.

	<i>Often.</i>	<i>Sometimes.</i>
Day		
Night.....		

Any further Comments :

Note.—The above is a full account of the information asked for on the card of enquiry. It does not represent the actual lay-out of the card. This was arranged so that, as far as possible, work on the card should be minimized by asking the worker only to make ticks in answer to question.

For example, the entry for sleeping conditions appeared on the card as below :

SLEEPING CONDITIONS. (Please tick.)

<i>Own Room.</i>	<i>Shared with 1.</i>	2	3	4	<i>Own Bed.</i>	<i>Shared with 1.</i>	2

A STUDY OF SOME EFFECTS OF EVACUATION ON ADOLESCENT GIRLS.

By MAGDALEN D. VERNON

(*From the Cambridge Psychological Laboratory*).

- I.—*Introduction and general argument.*
- II.—*Description of the investigation and of the type of data obtained.*
- III.—*Description of the main effects :*
 - (1) *The effect upon working habits.*
 - (2) *The effect upon leisure habits.*
 - (3) *The effect upon social relationships.*
 - (4) *The effect upon the attitudes to careers.*
- IV.—*Conclusions.*

I.—INTRODUCTION AND GENERAL ARGUMENT.

THE most important aspect of evacuation, from the point of view of the older child of eleven and upwards, is the dislocation of his normal habits of living. Moreover, to the child who comes from a social class in which parents rarely if ever send their children to boarding schools, this experience is entirely outside the accustomed horizon. Before the war neither child nor parents had ever envisaged at all definitely a state of affairs in which they would be separated from each other ; nor do they live in a social group where such separation is familiar. When he is evacuated the child, moreover, not only loses his habitual home background, with brothers and sisters and home occupations as well as parents ; but also the familiar environment of school, town, amusement facilities, and so on, and often his companions as well. Only the school teachers as a rule remain the same ; and that intangible entity, the school "ethos" or tradition or way of life, which may endure at least when the school is not itself split up. It is rather natural, then, to suppose that the child may feel a considerable increase of the importance in his life of his relationship to the school group. And thus a study of his attitude to this school group may throw some light upon his reactions to the immediate changes produced by evacuation, and upon the possibility of any subsequent and long-distance alterations in his character and way of life.

From the data presented in this paper it will appear that three main types of change may occur in the child's general attitude and behaviour :

- (1) Thrown to a greater degree upon his own resources, he may display increased independence and initiative, a bolder attitude towards life, and a greater readiness to make the best use of his opportunities, or to strike out for himself.
- (2) When the discipline of familiar habits and controls is relaxed he may become wayward and unruly, discontented and disgruntled, or apathetic and simply "out for a good time."
- (3) He may be overcome by the strangeness and the difficulties of the new social environment, and think only of returning as speedily as possible to the old familiar one; or may cling the more closely to any support or protection which is afforded by school teachers and the group of school companions.

Which of these effects will occur as the result of evacuation must vary under different conditions. It has been a defect of official literature on the subject that the possibility of such variation has too often been ignored. Clearly, the child's own personality is the first determining factor; and we shall see below that examples of the various types of behaviour occurred in each one of the different school groups, irrespective of their environmental influences. There are always children with a strong natural bias towards independence, to waywardness or laziness, or to dependence. The tendencies of such children are likely to appear more clearly as the result of evacuation. But also there are always children who have no very strong tendencies of these kinds, and whose behaviour seems to a great extent to be determined by the influence of the social environment. Normally, the strongest influence seems to come from the home. But, as we pointed out, the children are separated from their homes, while the school environment remains relatively persistent, though not unchanged. It is not surprising, therefore, that any conflict between home and school becomes more pronounced; and in some cases loyalty to the school and its traditions may become a very important factor in the child's life.

II.—DESCRIPTION OF THE INVESTIGATION AND OF THE TYPE OF DATA OBTAINED.

The focal point of the study of these alterations in attitude and behaviour resulting from evacuation was the child's school life and his relationship to the school group. This, of course, limited the scope of the investigation, but had the advantage of controlling it (since the number of aspects from which the effects of evacuation may be studied is great). Moreover, it was possible to link up with this aspect much

information about leisure habits, occupational wishes, and the out-of-school social environment ; all of which threw more light on the effect of changed conditions and interrupted habits. A further limitation was imposed by the form of the enquiry. As in previous rather similar studies by the author,¹ a number of girls were questioned individually, each for about fifteen minutes, according to a general scheme of questions previously prepared (but not rigidly adhered to). These questions related to : whether the school work and home work were less or more difficult to do now ; what sort of things the girl was able to do out of school ; whether most of her friends had come away, too, or had been left behind, and if she had made any new friends ; how long she intended staying at school and what she would do when she left ; whether she would be glad or sorry to leave, and if being evacuated had made her more or less ready to leave, or had not made any difference.

This use of questioning meant that it was advisable to confine the enquiry to older and better educated children.² As a brief preliminary enquiry, it was carried out in four girls' secondary schools, all coming from one large town in the provinces, but evacuated to different places some five or six months previously. It seems probable that comparable data would be obtained from a wider field, showing the same general types of effect varying according to local conditions.

At each school as many as possible of the girls in the four top forms of the school were interviewed and questioned. No actual average ages can be given ; but the approximate ages of the girls in these forms were 17+, 16+, 15+, and 14+, respectively. The schools (all secondary) and the number of girls questioned were as follows :

Twenty-four girls from School A, drawing most of its pupils from the professional and well-to-do business classes. *This school had now returned from evacuation.*

Forty-two girls from School B, the pupils of which were relatively homogeneous in type, coming almost all from the lower middle classes.

Fifty-nine girls from School C, rather less homogeneous in type ; the parents belonged mostly to the lower middle classes, but some to the professional classes. Sixteen of these girls had now returned from evacuation and were being educated in their original school.

Sixty-one girls from School D, with a wider range of pupils than either B or C ; some of the girls were more cultured, while some came from poorer and less cultured homes than any at B or C.

¹ " The drives which determine the choice of a career."—*Brit. J. Educ. Psychol.*, 1937, VII, 302, and 1938, VIII, 1. " Characteristic motivation in the activities of school-girls."—*Brit. J. Psychol.*, 1938, XXIX, 121 and 232.

² A scheme of experiment has now been devised by which this enquiry can be extended to younger children.

III.—DESCRIPTION OF THE MAIN EFFECTS.

(1) *The Effect upon Working Habits.*

Numerous causes operated to produce a general dislocation of the girls' working habits. In the first place there was the change of surroundings—usually, in their opinion, a change for the worse.¹ Class-rooms were less commodious and convenient; library, laboratory, domestic science, art and music, and physical training facilities, were inferior to those to which they were normally accustomed. Secondly, the hours of work were changed. Ordinary school lessons were shortened, and held in the afternoon, usually from about one to five; and in the mornings the girls did preparation and certain extra lessons in church halls, etc., which were even less comfortable than the school buildings. Thirdly, they had not always their usual teachers; and the numbers in the classes were generally smaller. Fourthly, homework was usually much harder to get done, because often there were no quiet rooms in the girls' billets in which to work.

On the whole there was little active resentment of any of these difficulties; or it had died down in the five or six months since the schools were evacuated. But there were complaints of feeling unsettled by *the change in school hours and surroundings*:

School A: "Work was very difficult because unsettled; it was difficult working in strange surroundings, but we settled down." "It was difficult to settle to anything; there was no atmosphere of work." "We lived in rather a rush; the day was turned round, everything at different times; we wasted rather a lot of time." "It was rather difficult to get on with lessons because of the noise; there were thin partition walls in the school you could hear through; it was hard to remember things you learned; most people seem to have forgotten them. Things in the lab. were not so good; you never knew where they were."

School B: "It is harder to concentrate here; you can't settle down to work easily; lessons are no sooner begun than finished." "The school doesn't seem half as big here; it is less convenient, carrying books about."

School C: "Work is more difficult all round; you hear from one room to the next. It is hard to concentrate at any time; you look at the work and don't take it in." "You don't get on as well with lessons round this way. I try to do some work here in the mornings, but can't because of being with the other girls; this is so distracting." "I sometimes think I'm wasting my time here; I can't get the work done."

¹ It must be pointed out that these opinions and complaints, and all those subsequently mentioned, do not necessarily mean that conditions were as disagreeable as was implied. We are dealing here with the girls' impressions, rather than with the actual objective conditions experienced. They may, of course, in some cases be similar to the emotional and semi-hysterical exaggerations found by Burt (*Brit. J. Educ. Psychol.*, 1940, X, 8) in the complaints made by girls of twelve to fourteen; but this would not appear to be the case when there is a strong consensus of opinion among a number of girls.

School D: "It's not the same school life as before; it all seems so disjointed; the girls don't meet one another the same way as they used to." "In school there is no settled place to work; you have to work where you can." "I can't get so much work done; I can't settle down to it." "It's hard getting used to different surroundings."

Naturally the frequency of such complaints varied according as to the amount of inconvenience encountered. General complaints of the kind quoted above were made by the following numbers of girls: School A, 11 (42 per cent); B, 6 (14 per cent); C, 16 (27 per cent); D, 11 (18 per cent). Loss of particular facilities, especially in practical science, were mentioned as follows: School A, 8 (33 per cent); B, 2 (5 per cent); C, 14 (24 per cent); D, 13 (21 per cent). But the fact that complaints of this kind were relatively more frequent at School A than at the other schools was not due only to a greater contrast in amenities (although this school was particularly well equipped with science laboratories). The girls at this school were of a higher social class than the others. They were more accustomed to their comforts, and more ready to resent the loss of them. This fact will appear again in their attitude to their leisure occupations.

There seemed to be a fairly general impression that it had been harder to work, less had been learned, and that would be less well remembered. But it was *the difficulty of getting homework done* which pressed most hardly on the girls. It has been the object of school and billeting authorities to keep all evacuated children as well occupied as possible. Since ordinary school hours were shorter than normally there was often more homework than usual to be done. But in very many of the houses where the girls were billeted there was no quiet room for them to work in; the wireless was on all the evening, adults were talking, younger children were playing. Some of the girls were accustomed to this state of affairs at home; but many were not. As one girl put it: "Billetees can't be quiet, like parents;" and 44 per cent of the girls in all the schools found this a difficulty. On the whole, however, these difficulties were accepted philosophically. There was little resentment of them, and little distress was consciously felt as the result of the disorganization which they produced. But in one or two cases somewhat distracted feelings were apparent, especially in girls who were working for special examinations:

School A: "I'm behindhand with my work; I've had fewer lessons. It was an old laboratory; the light was bad; it was difficult to find things. We wasted a lot of time in the mornings playing games, and having late breakfast. One couldn't use odd moments to work in; the juniors were

always rushing around. . . . But in spite of the war I felt I might as well go on with teaching as anything, as I'd got so far."—(W.N.)

School C: "The lessons are much harder here. There's very little time for anything but lessons. I can't do practical work in science. Homework suffers; one can only do the set written work; there's very little time for study on one's own. It's more difficult to work—people talk; you can't ask for a room of your own to work in. It's hard in the exam. year. I shan't be sorry to leave. Evacuation has made me fed up with school. But I've been accepted for a degree course at the University and I'm taking up teaching."—(S.J.)

School D: "It's not so easy to work here as at home—you can't concentrate so well in other people's houses. I don't get much done; I take a long time over prep. I would like to be a foreign correspondent or a teacher of languages, but I'm not clever enough at the rest of things to be able to do it. I might have stayed on (at school) if we'd not been here; but now I shall probably leave."—(W.V.)

Comparing these three cases we see that W.N. and S.J., who, it is true, were older and higher up the school, were not so greatly affected as was W.V. They had no intention of allowing the disorganization of their work to interfere with their subsequent careers. W.V., however, seemed to be ready to give up the struggle and not try to do any more school work.

But even when there was no strong feeling of unsettlement among the girls, *the disorganization of habits and traditions* was apt to appear in other ways. In most girls' secondary schools there is a strong tradition of disciplined and controlled behaviour. Thus rules and prohibitions of things themselves unimportant (such as talking or running at certain times or in certain places) are stressed because they are held to be essential in inculcating habits of self-control and consideration of others. It had frequently been necessary to relax many of these rules; and others could not be enforced because staff and prefects were otherwise occupied. The opinion was expressed at all four schools, and especially at C and D, that this relaxation had had a deleterious effect:

School C: "The juniors are quite out of hand now; they pay no attention to the prefects, and talk as much as they like on the stairs." "One feels we should do more prefect duties, but we haven't the opportunity. There are set duties at home; here we have to take the opportunity when we can. The children are noisy and out of hand. There are no punishments down here. Conditions are difficult. But . . . they're settling down."

School D: "School discipline has gone altogether. It's time prefect duties were started again; punctuality and attending to notices and being quiet in preps are dreadful."

Whether, in fact, this effect was as harmful as indicated cannot yet be determined. This particular tradition is one which is dear to

these schools, but possibly it is not always as important as is believed. However, it seems quite probable that the second class of individual whom we described above, the naturally undisciplined or lazy, might take advantage of such a relaxation of discipline to make herself an intolerable nuisance to the community.

(2) *The Effect upon Leisure Habits.*

We have already mentioned that every effort is made to keep the evacuated children well and happily occupied; but not unnaturally there are considerable difficulties in doing this. Outdoor games and sports have often been less easy to carry on, through lack of playing fields, tennis courts, swimming baths, etc.; 28 per cent of all the girls mentioned this (irrespective of those who pointed out that it was due to the bad weather). On the other hand, the girls have as a rule been living nearer the open country, and have had better opportunities of cycling and walking; 22 per cent mentioned this fact. But both outdoor sports and amusements, such as going to theatres, concerts, cinemas and parties, have been curtailed by the black-out. No girls were allowed out unaccompanied after the black-out. Indoor hobbies have sometimes been prevented by lack of room or of the necessary materials and appliances. This was particularly unfortunate in the case of music and art. Although actually less than 10 per cent of the girls mentioned this difficulty, it was the abler and keener who were particularly affected. Finally, there seemed to be a general feeling that there was less time for hobbies and amusements because the school hours did not end till about five p.m., and there was often more homework to be done after that, and in the week-end. School D had Saturday morning school, and School A, Saturday afternoon school.

On the whole, *the deprivation of amusements* and leisure occupations was much more strongly felt and aroused greater discontent than did any of the school difficulties (except in the case of the afore-mentioned girls who were working for special examinations). The number who said that their leisure occupations had been curtailed, either by lack of time or of facilities, was: School A, 20 (83 per cent); B, 20 (48 per cent); C, 44 (75 per cent); D, 30 (49 per cent). (These figures do not include complaints of the curtailment of "school games.") Schools A and C seemed to feel the deprivation most:

School A: "Life got very same-y; there were no friends to go out with in the evenings. It was an impossible existence in winter, though not bad in summer."—(D.P.) "There was so little out-of-school time; it was difficult having no week-end, school seemed continuous all the while."

School B: "Not so much outside activities, not the same interests here." "Not much time to do things out of school." "Not much to do here out of school."

School C: "Seems to be all bed and work here." "There's not much we can do here, only read and knit; we go to bed as soon as prep. and supper are done. There's no time to go out." "Some weeks all one's spare time seems to be filled up."

School D: "No time at week-ends now; there's not much to do here." "Nothing much to do at week-ends here; it's rather dull."

This lack of time and opportunity for leisure occupations was often accompanied by resentment at *the restrictions and loss of liberty* resulting from living in someone else's house, and from the special regulations imposed by the school:

School A: "I was with people who couldn't bear change; they liked life to be the same every day. We couldn't go out in the evenings"—(D.P.). "The billet people were old; they hadn't had much to do with young people; they didn't understand them; it was obvious they wanted to get rid of us." "I felt rather restricted; I like going for long walks and going to the pictures; this was not possible except when going with the billet people or parents. I rather wished I hadn't been with the school when it was evacuated because of the restrictions." "We were under school discipline all the time; we couldn't go anywhere without saying where we were going."

School B: "They are very severe people in my billet—Plymouth Brethren. They don't like my going walks with the other girls or reading certain books. They won't let me go to the pictures ever." "Black-out makes it hard to do things out of school." "I can't play the piano in my billet; the dog has hysteria and the people don't like it."

School C: "We had to be careful what we did do. We couldn't do much at the billet; they were so careful of us." "We could do about one and a half hour's prep. at night, and after that we had to be polite and sociable."

School D: "I like walking and cycling, but my landlady doesn't approve of it at nights." "You can't do what you like in billets as if you were at home; you have to take the billet people into consideration."

It seemed that the complaints were often more resentful in tone, as well as being relatively more numerous, from the School A girls than from the others. These girls came from a social class in which it is not unusual for girls to go to boarding schools; and, indeed, a number of them had themselves been to boarding schools before attending School A. Yet they definitely resented restrictions which were little, if any, more severe than those which normally exist in boarding schools, though naturally more strict than those of their ordinary home life.

The reason for this seems to have been that they regarded these restrictions as being "infra dig."—an impugnement of their ability to look after themselves and regulate their own lives. D.P., who was sophisticated and rather self-willed, exemplified this attitude well. Moreover, the people with whom they were billeted frequently belonged to a lower social class than themselves, and the girls were to some extent contemptuous of the habits and customs of people whom they considered to be inferior to themselves in the social scale. Thus the girls' resentment at a particular change in their habits of living was in some degree reinforced by class traditions in their manner of living.

In School C, however, the prevailing attitude was not so much that of resentment against restrictions as of boredom and regret at their deprivation of leisure and amusement. It is not clear why these girls should have felt this more than did the School C and D girls, unless it was that they were more expectant of returning to their own school and homes, and thus less resigned to evacuation conditions. One might hazard a guess that they would be the more eager to take the opportunity of any more freedom and amusement; and that there might be a certain danger of their being "all out for a good time."

But the attitude of resentment and depression was by no means universal. We noted above that 22 per cent commented on the increased opportunity for walking and cycling in the country. In addition, a number of girls expressed *their pleasure in their new experiences*—seeing new places and new people. We shall return in the next section to the "new people"; but we include here some comments on the other new experiences:

School A: "I made new interests instead (of following old ones)." "I liked—very much, for a trial; it was a change." "I enjoyed seeing other people and the country; it was marvellous country." "I was sorry to come back, because there was more country there."

School B: "I have enjoyed evacuation; it is not dull at all. One is quite free to do anything" (cf. with impressions quoted above).

School C: "It has been a great experience; it has broadened my outlook on life." "I have quite liked evacuation—new people and new surroundings." "It is quite interesting to be in a different part of the country."

School D: "I have thoroughly enjoyed coming away and seeing more." "It is fun really with evacuation; it makes it more interesting to have a change." "We've enjoyed it, most of us. It's different here." "I have liked the evacuation experience—seeing different people and surroundings and conditions."

On the other hand, a rather frequent comment was: "It was quite an interesting experience, but now I want to go home."

(3) *The Effect upon Social Relationships.*

We come here to the crucial point in the evacuation situation—the separation from parents, home and home friends, and the encounter with new family and social groups. We have already pointed out that for most of the children, at least at Schools B, C and D, such a separation has hitherto been quite outside the bounds of experience and even of expectation. In information collected before the war about the occupational wishes of school girls appeared over and over again the desire to do work which would allow one to live at home.¹ Even those who intended to do elementary school teaching often wished to go to the nearest training college and afterwards return to teach in their own home town. Moreover, it will appear below that this home tie was if anything more strongly emphasized by the parents than by the children (here financial considerations played a part). The strength of this tie is the more surprising when one considers that all the girls studied had reached adolescence, and that within five or ten years a large number of them would be finally leaving home to marry. But it does appear that the permanence or otherwise of evacuation will depend upon the possibility of adjustment to the weakening of this tie.

It is difficult to obtain any quantitative evidence about the prevalence of this "*home-sickness*." If children are asked directly: "Do you want to go home?" or, "Do you miss your parents?" they are likely to answer "Yes," because they feel it would seem heartless not to do so. Thus most of the evidence obtained was dependent on indirect questions about how they liked evacuation, and upon spontaneous remarks such as the following (occurring in 29 per cent of all cases):

School A: "It's nice to be home again. It makes a difference to work, you feel more settled. I might have left if they'd stayed (away) a year, from dislike of being away from home."—(L.R.).²

School B: "I try to put up with it here. It's dreadful to be in —; I hate being away from home." "It is a long time to be cut off from home." "I miss my parents greatly." "It will be lovely to go home."

School C: "I didn't like —. I couldn't get used to it; it was so very different. I felt the pull from home. I couldn't have stuck it if evacuation had gone on."—(W.H.) "Homesickness decided me to come back."¹

School D: "It's difficult to settle to things, due to being away from home. The prospect of taking exams. from here is frightening, while being away from home. I miss my parents,"—(R.P.) "I don't want to stay on at school; it's a shame to miss a chance to go home."—(B.M.) "I can't work

¹*Op. cit.*, *Brit. J. Psychol.*, 1938, XXIX, 121 and 232. This wish appeared even more strongly in some unpublished data collected by the author at a secondary school in the north of England.

²These children had now returned from evacuation.

so well without my parents. I want to get home ; I start to fret if I don't hear from my parents."—(B.A.) "I'm fed up with being here ; it was awful coming back after the Christmas holidays ; I dread coming back after the week-end."—(K.M.) "It's so different from being at home ; it makes one fed up."

More evidence of the strength of the homesick feeling was shown by the fact that 69 per cent of the girls at School C who had already returned from evacuation reported homesickness, as against only 12 per cent of those who had remained.

There were a few adventurous spirits, however, who thought that evacuation had made them more independent and able to get on away from their home background :

School B : "It has broken me in to being away from home." "It has made me more independent." "I've been broken in to going away from home—I shan't mind it." "I've had to think for myself a bit more."

School C : "I feel more capable now of standing on my own feet ; at home mother does everything."

School D : "I appreciated school more when I was evacuated ; it made me more independent."

Again, it was not easy to obtain evidence of the actual number of cases in which *the parents were exerting undue pressure* on the child to return home, except when the child spontaneously remarked on it. A negligible number of such cases occurred at Schools A and B, but they were quite frequent in the lower forms at School D (39 per cent) :

"Mother wants me to leave at once ; I want to stay on and become a nurse. Mother wants me to go in an office. I don't want to. She wants me to come back. She goes out to work, so does my brother, so she wants me to do the housework."—(F.E.) "Mum keeps on saying she wants me home, but I don't really want to go. I don't know what I'd do ; I wouldn't get a job yet. But I wouldn't like to sit about all day."—(T.K.) "I don't think I could stay that long at school (two years in the sixth form). Mother wants me home."—(M.D.)

The quantitative evidence was more definite among those at School C who had returned from evacuation. They were asked : "Did your parents want you to come home, or did they leave it to you to decide ?" Seventy-five per cent reported that their parents *did* want them to come back. Usually it was because "Mother wanted me back," "Mother was so lonely," "Mother was ill ; my brother is in France ; she got worried and run down."

In many cases also *the girls missed their friends and familiar companions*. Forty-two per cent of the girls reported leaving most of their best friends behind, because the latter had either stayed at home, left school or been evacuated elsewhere :

School A : " I had no friends to go out with in the evenings." " I hadn't many friends there ; a good many stayed at home."

School B : " Most of my friends are at work, and I miss them." " My best friend stayed at home and went to work ; I've only met one girl here and she dropped me almost at once." " I'm separated from my real friends who go to work ; I would like to be with them again."

School C : " It's more difficult this term with friends going back home ; it makes us want to go back ourselves." " I've not many friends here ; I don't know a lot of people at all." " All my school friends are here ; but I miss my out-of-school friends a lot." " I had no friends there ; I was billeted with a girl I didn't like much." " I didn't enjoy evacuation much, not having any special friends."

School D : " There was a set of us at home that used to go to the League of Nations Club ; we're quite scattered now." " Several of my best friends went back ; it was rather a shame they should have done." " None of my friends came here ; I haven't any friends in my own form."

There were certain compensations for this : 46 per cent of the girls reported that they had made new friends in the places to which they were evacuated. The opportunity of meeting new people was frequently noted as being a point in favour of evacuation :

School A : " I liked the people we were living with ; they did everything they could for us."

School B : " It was interesting meeting people with different views." " I have liked meeting fresh people." " Evacuation is quite interesting, going to another house and meeting other people, knowing how they live and coming to another town."

School C : " I have enjoyed it thoroughly, seeing other people and the way they live." " You learn about different people's ways—an interesting study." " We have had a great experience, meeting different people and seeing how they live."

School D : " Evacuation broadens your outlook, brings you into contact with the outside world ; you make more friends." " You meet more people when evacuated." " I'm not sorry I came, I like meeting new people."

A number also said : " It makes you appreciate home more." But some, especially of the School C girls, deplored that the restrictions on their time and freedom had prevented them from meeting as many people as they had hoped :

School B : " There's not much time to do things out of school ; not much opportunity to see the — girls."

School C : " I don't know any people at all ; there's not the opportunity to get to know them." " I've not made any new friends ; I hoped to make a lot ; it's disappointing." " There's very little time to meet anyone."

But there were reports from all four schools which indicated that *school, school companions and teachers were more highly appreciated* ; they were more thrown together, and developed a feeling of increased " solidarity " and mutual reliance :

School A : " I love school ; I've liked it more since we were evacuated ; I got to know the others better when we were away, there were so few of them." " I liked school more when we were evacuated ; when at school I felt all the others were in the same boat, away from home."

School B : " All the form have got to know each other better ; they are kinder to each other ; also we've got to know the mistresses better." " I have made a lot more friends with girls in my form ; evacuation has made us greater friends, brought us closer together. It's a jolly fine set of girls in this school, and we're all together." " Now we've joined together in forms ; we used to be more individual."

School C : " We've been much more friendly to each other here ; at home we always used to have feuds between the two halves of the form." " Evacuation has improved school ; we are more friendly and know each other better, and are more in touch with the teachers." " I've liked school more since evacuation ; we've seen the better side of the teachers."

School D : " School people have been thrown together a lot by evacuation." " One gets to know more of the other girls in the form here than one did at home." " The staff have been very good, and have tried to make us feel less lonely."—(R.P.)

There seems little doubt that it was this play of conflicting social influences which had the most powerful effects on the children. The " new friendships " and the " broader outlook on life " were not very potent factors in the conflict ; the latter, in fact, was given rather in the spirit of a quotation from the pronouncements of the " powers that be." The serious influences were the " pull from home," and the loyalty to school and conformity to its traditions and mode of life. This was clearly voiced by W.H. at School C, who felt the " pull from home " ; " my parents were not keen for me to go in the first place ; I went away because the other girls did ; " and by L.M. at School B, who said : " It's a jolly fine set of girls in this school, and we're altogether." This feeling of " solidarity " was strongest at School B, and provided a powerful obstacle to the drift back home. The billeting conditions of these children, their nearness to their home town, and the frequent visits of their parents might otherwise have caused more of them to return than the 20 per cent. who had actually done so.

The school tradition was further reinforced by the desire, felt especially by the older girls, to " make the most of their education " :

School B : " The war has made me realize I must make the most of my education." " I would rather stay on at school and get a good foundation ; my parents want me to have a good education." " I would hate to leave school now and go into some horrid little job ; my grammar school education would be wasted."

School C : " I would rather stop on at school and do something really worth while ; I want to go on with my education." " I want to be wherever there's a better education " (stated frequently).

School D: "I want to stop on at school to have the education. Mother misses me and would like me home, but she wants me to finish school." "My mother would rather I stopped on here and saw it out."

In the next section we shall study in more detail the attitude towards leaving or staying on at school.

(4) *The Effect upon the Attitudes to Careers.*

It might be supposed that the effect of evacuation and the discontent which it aroused would be to make many girls over fourteen *wish to leave school altogether* as soon as possible.¹ This was, in fact, the case at the three schools B, C and D; but the tendency operated quite unevenly. In all three schools the sixth forms had kept up their numbers well, and most of the girls were staying on until they had finished their intended course of study (see the marks quoted above). Comparatively few girls were leaving during their year in the upper fifth form, though a large number intended to do so at the end of the school year as soon as they had taken the School Certificate examination. It is usual for about half of the girls to leave at this age, and about half stay on into the sixth form.² The numbers at School C and D who definitely intended to stay on was certainly less than that. Moreover, the number of girls who leave before the end of their year in the upper fifth is usually small; but among the evacuated children, especially at School D, a considerable number were leaving in the fourths and lower fifth. In Table I are given the percentage of girls in the upper and lower fifths who were staying on at school, and those who said quite definitely that they were leaving earlier because of evacuation.

TABLE I.

	Per cent staying on at school in Forms :			Per cent leaving sooner (in Forms VI, Upper V, Lower V).
	Upper V.	Lower V.		
	Into VI.	Into Upper V.	Into VI.	
School A ..	40	100	100	13*
School B ..	44	90	40	12
School C ..	33	92	23	10
School D ..	13	72	17	30

*This number would have left sooner if evacuation had continued.

¹Since education was not at this time compulsory for evacuated children the "penalty clause" against leaving a secondary school before the age of sixteen could not be enforced. Thus these girls could leave and enter employment at the age of fourteen.

²At the north country school visited before the war (see footnote, p. 123), 53 per cent of the girls in the Upper V were leaving at the end of the school year.

It must also be remembered that a large number in these forms had left school already. For instance, at School D, 44 per cent of the children had returned from evacuation since the beginning of September, 1939; but the distribution was as follows: Form VI, 5; Upper V, 1; Lower V, 19; Upper IV, 31; Lower IV, 18; Upper III, 6. Not all of these girls had left school for good and all and entered employment; but a majority of those over fourteen (from the upper fourth upwards), had done so. (In any case their school life was temporarily suspended since there were no facilities for secondary education in the district in which they lived.) But since so few of the girls over fourteen were remaining in the school at all, after the end of the present school year the sixth and upper fifth forms would be almost denuded.

The reasons for this early leaving can be understood from the remarks quoted below:

School A: "I might have left if we had stayed away a year, from dislike of being away from home"—(L.R.). "I would have left if we'd gone on there; it was an impossible existence in winter, though not so bad in summer."—(D.P.)

School B: "I shouldn't like to stay on at—any longer than necessary." "I'm thinking of going home because mother lives by herself; my father's in the Army; my sister's been ill for a long time; mother would like me to leave soon; I would rather leave myself."—(F.J.) "I would like to go in the W.R.N.S.; if school is still here, I'll do this. I don't like it here."

School C: "I shan't be sorry to leave if we stay here." "I wouldn't like to stay on in the sixth if we had to be here all the time." "It's made me want to leave, because a lot of my friends have left and gone into jobs."

School D: "I shan't be sorry to leave; I didn't want to come back for a third year." "I had made up my mind before evacuation to come back for a third year and have another try for Oxford, but I mightn't do so now"—(R.P.). "I might have stayed on another year to do shorthand and typing, but mother wants me at home." "I shall leave this year because I'm the eldest; I might have done another year if we'd still been at —; lots of girls who've left wouldn't have if we stayed on at —"—(S.I.). "I expect to have to go home in four weeks; mother's been ill, and I shall have to stay with her. I wouldn't have left if we'd been in —. I shall have to live at home for about two months; I don't know what work I'll do then, I'm not really fit for anything"—(S.P.). (See also B.M. (p. 123), and B.A., K.M., F.E., T.K., M.D. (p. 124).)

Clearly the only school in which evacuation showed little sign of producing early leaving was School A (L.R. was an exception). It must be noted that about two-thirds of the girls at School A had not gone away with the school; but the majority of these had been privately evacuated to schools elsewhere. The tradition of this school and of the class of girl attending it would have been strongly opposed among all

but the minority of girls to early entry into employment.¹ But, had the school remained away much longer, it is quite possible that a number of parents might have been unable to continue to pay school fees, and might have been compelled to take their daughters away from school, and possibly send them into employment. But it is most improbable that a general "rot" would have set in, as it appeared to be doing at School D, especially in the lower fifth and upper fourth forms; and that numbers of girls would have left as soon as possible, partly in order to help the family finances, and partly because parents and children could not bear to be separated.

Schools B and C seemed to be intermediate in this respect. A number of girls from these schools had left to go into employment, or to commercial colleges, and more wished to do so; but loyalty to the school and its tradition of the importance of getting a better education seemed to be strong enough to hold many girls and prevent them from leaving. (Thus many of the older girls at these schools intended to enter the teaching profession.) Also many of those who had gone home had done so intending to go to schools at home which had re-opened and were giving some education. That at School C was almost full-time; and thus it is not surprising that 40 per cent had returned, as against 20 per cent from School B, where the home education was only part-time. The fact that the number who intended staying on in the sixth form was less at School C than at School B was due to a general uncertainty as to what career they intended to take up, rather than to a wish to leave sooner. The disorganization of the school had prevented the head mistress and staff from discussing the matter thoroughly with the girls.

A parallel attitude to *occupations which necessitated going away from home*, either to train or to work, was in evidence in some cases:

School A: "I'm not attracted by the University; I don't want to leave home."—(L.R.)

School B: "A possible danger of going into the Civil Service would be that I might be moved and might not be able to live at home; I would like to stay at home for a bit." "Daddy would rather I did the Civil Service Executive exam.; he doesn't want to part with me any longer." "My

¹The percentages of girls going to the University and intending to enter professions were as follows:

	<i>School A.</i>	<i>School B.</i>	<i>School C.</i>	<i>School D.</i>
University ..	50	21	12	26
Professions ..	67	64	36	46

Thus School A contained the largest proportion of girls going to the University and intending to enter professions.

parents will decide what I'm to do ; my father would like me to be at home." " I should like to do domestic science, but I shouldn't like to have to travel about much."

School C : " I would like to get a regular job, near home ; I would like to live at home."

School D : " I would rather live at home (to work), especially after evacuation ; I want to see some more of my parents." " I wanted to do domestic science, but that's not possible now ; it would mean living away from home and I don't want any more of that." " I would love to do nursing but mother won't let me ; she wants me not to go away from home." " Mother wants me to leave at once ; I want to stay on and become a nurse."

As we have already mentioned, this desire not to do work which will necessitate going away from home is frequent in any circumstances. We have no clear evidence that it would prevent girls, except in isolated cases such as those quoted, from doing the work they intended to do. It does, however, give evidence of that general timidity and fear of standing alone, which, as we have already shown, was enhanced in many cases by the loss of support of the familiar home background. Other girls demonstrated this timidity and lack of self-reliance in the fear of losing the support of school, and in their desire to stay on at school as long as possible (incidentally, there was no evidence of this feeling at School A) :

School B : " I prefer school life to other things, and definitely want to take up teaching."

School C : " I don't want to go to work ; I shall be glad to stay on at school." " I hate the thought of leaving ; it's horrible to earn your own living." " I can't imagine life without school ; it's such a big change."

School D : " I dislike the thought of being so grown-up." " It will be horrid not to belong to a school, but there's no need to break off with the mistresses." " I'm sorry I'll never be able to go to school again."

But it was not really possible in many cases to distinguish between the *influence of evacuation* upon the attitude to their career and between that of *war conditions in general*. A number of girls said that " the war had made them not want to do a long training." This was partly because of the strain on their parents' finances, and partly because they felt generally unsettled and anxious to go out into the world :

School A : " The war makes you want to do something, but it's no good doing something that comes to an end."

School B : " I was going to do secondary school teaching, but when the war broke out I thought the training would be too long. If we'd been at — I should have stayed another year and done secondary school teaching."

School C : " The war has unsettled me about going in for a long training ; I feel more like starting a job at once." " The war has made me more keen to get on with the job." " I'm keen to start work on a proper job." " I thought of nursing but decided against it ; it's such a long training."

School D: "I didn't want another three or four years' training; I wanted to get down to it." "I would like to be a gym. mistress, but it means staying on too long (at school)."

Evidence of the general feeling of unsettlement was afforded by the reports of boredom with school and its restrictions, and a consequent *desire to get out to work*. This feeling was often reinforced by the fact that so many of their friends had already left and started work:

School A: "One begins to outgrow school; I've got a friend at the University who makes me keen to get there, too."—(D.P.) "I'm quite ready to go; one can't stay at school for ever." "I'll be glad to leave; I want a different sort of life from school." "I've wanted to leave just lately; I want to do something for myself; I get sick of the same people." "I'll be glad to have less work to do."

School B: "I don't want to stay on at school after taking School Certificate; I shall have had enough school by then." "I would rather have my evenings free instead of doing homework." "I would like something varied; I get bored with doing the same thing every day."

School C: "It made me want to leave because a lot of my friends have left and gone into jobs." "I'll be glad to leave exams, and homework." "I don't like school; I don't get on well with lessons; I feel out of it." "I've had enough school now; I didn't think of coming back." "I've had long enough at school now; I'm keen to start working."

School D: "I want to start work, my friends have started; you think you're out of it when you're still at school doing homework." "I'll be glad to leave because I dislike homework; I shall have more time for hobbies." "I shall be quite glad to leave school; I dislike school; I want more independence; there are so many different things to do at school, you can't concentrate on what you like." "I shan't mind leaving, I don't like school at all, I don't like sitting about a lot; I like to be active."

The majority of those whose opinions we have just quoted wanted more freedom from discipline and the restriction of school; that is to say, they belonged to the type whose main desire was to do as they liked, to follow their own impulses possibly to the extent of becoming wayward and uncontrolled. But some of them felt that they were now old enough to be independent, and to determine and control their own lives; they showed evidence of real enterprise and ability to strike out and act on their own initiative. Further examples of these are given below:

School A: "I want to have something to take up and earn my own living."

School B: "I want something active, I don't like not being occupied." "I'm not keen on an office job; there's just one side to it; it is a shame not to go on learning once you leave."

School C: "I would hate to be tied down to one thing." "I wanted something with more fun in it—going abroad. I would like to go out and try to do something for myself." "I don't want to go in an office; I want a job I can get interested in and move round in."

School D: "I should be bored staying at home; I want to go abroad to some outlandish place. I don't mind being by myself."—(C.S.) "I wouldn't like just to stay at home; there would be no outlook, it would be rather morbid."—(G.B.) "I would rather do a job and meet people and go about." "I want to have a career, I would hate just to idle at home. I always wanted to go to the University, it gives you a deeper balance, as well as a better knowledge of the subject."—(M.M.) "I wouldn't like to sit in an office; it would be nice to do lots of different things, and meet all sorts of people; I would like to do something exciting, travelling or something."—(T.K.)

It is clear then that evacuation and attachment to home have not destroyed all the adventurousness and enterprise of these girls. It is particularly interesting to notice the real independence of several of the girls at School D, and to contrast them with those described above who would do anything to get back home. C.S. and G.B., together with G.M., who said "evacuation made her more independent," formed a small group of friends who stood out sturdily against the general homesickness and maintained that "evacuation broadens your outlook, brings you in contact with the outside world." T.K. had acquired somewhat of the same attitude from her brothers, who "have got all sorts of ideas." But she had to contend with her mother, who "keeps on saying she wants me to come home; I don't know what I'd do, I wouldn't like to sit about at home all day." M.M., a highly intelligent child, who carried out original chemical experiments when she was at home, was perhaps less adventurous, but was determined to lead the life that would give her the fullest and most valuable experience.

IV.—CONCLUSIONS.

We have now presented all the evidence as to the unsettling effects of evacuation upon the girls, and described the types of effect and the conditions leading to these. It appeared that in the main alterations in school conditions were felt to be rather unsettling generally, but that most girls had become fairly reconciled to them. Certain individuals, however, who were working for special examinations, naturally were inclined to resent a loss of facilities which was likely to interfere with their chances of success. There were also indications of a tendency, most apparent at School C, towards a general decrease of order and discipline, resulting from the unsettled conditions of school life and work.

Interference with leisure habits and occupations was more strongly felt, especially at Schools A and C. The girls at School A, in particular, had been accustomed to a great variety of opportunity for leisure occupation, and considerable freedom of activity out of school hours. Thus

they, and to a lesser degree the girls from the other schools, resented not only the deprivation of facilities for such occupations; but also the restraints on their liberty necessitated by living away from home, in a strange town, by the black-out conditions, etc. The School C girls, however, seemed to be more bored than resentful. But, on the other hand, there was a number of girls at all the schools who definitely enjoyed the opportunity of going away and seeing new places and being able to walk and cycle in the country round.

It was, however, in respect of social relationships that the unsettling and disruptive effect of evacuation was most strongly felt. Cases of homesickness occurred in all the schools, but most frequently and most markedly in School D. At this school also the pressure exerted by the parents upon the girls to return home seemed the strongest, though there was good evidence of it among the girls at School C who had actually returned from evacuation. This attitude on the part of the parents had a more unsettling and distressing effect upon the girls than had anything else in the evacuation situation. Furthermore, it enhanced the tendency to avoid any kind of further training or occupation which would necessitate going away from home, and it encouraged many girls to leave the evacuated school altogether, as soon as they were fourteen years old, and to enter the first type of occupation that presented itself, rather than to stay on longer at school and obtain a better training and qualifications. The generally unsettling effect of the war often also reinforced this tendency.

A strong pull was also exerted by home friends and social groups. This again strengthened the desire to leave school and go out to work, as many of their friends had done. It was to some extent counteracted by: (a) the formation of new friendships. But the School A girls seemed not to have taken advantage of this opportunity; while the School C girls complained that their opportunity had been insufficient; (b) the increased friendliness and solidarity with the other girls and loyalty to the school itself—seen especially clearly at School B. In particular, the kindness and sympathy of the teachers helped to reconcile some of the children to their separation from their parents.

There were, however, always exceptions among particular individuals. There were those who thought that evacuation had made them more independent and ready to stand on their own feet and manage their own affairs (see particularly pp. 123, 124 and 131). There was a number of girls at all the schools, especially among the older girls at Schools C and D, who were determined to "make the most of their education," even when school conditions were unsatisfactory and when they missed their parents and

friends. Also in many cases the parents supported this attitude and encouraged the girls to finish their school careers. There were a few who were generally "fed up" with school, lack of amusements, living away from home, etc., and just wanted to go home in order to "have a good time"; but there was no evidence to show that such cases were frequent, or that their number had been increased by the effects of evacuation, however unsettling to the girls' normal lives.

I wish to make acknowledgment to the Medical Research Council for the grant which has enabled me to do this work. And I wish to thank most cordially the head mistresses and staffs of the evacuated schools for the assistance which they have given me, often at the cost of considerable trouble to themselves.

THE RELATION BETWEEN INTELLIGENCE AND PROFICIENCY IN BINET-SIMON TESTING.

By M. BOOLE STOTT

- I.—*The enquiry.*
- II.—*Lack of uniformity of conditions.*
- III.—*Results :*
 - (a) *Average Group Test 33 score for each efficiency grade.*
 - (b) *Coefficient of Mean Square Contingency.*
 - (c) *Effect of rejecting lowest 10 per cent or lowest 30 per cent of group test scores.*
- IV.—*Efficiency of testing after further practice.*
- V.—*Summary and conclusion.*

I.—THE ENQUIRY.

SINCE 1934 the National Institute of Industrial Psychology has been holding courses of instruction twice a year in the administration of the Binet-Simon tests. It was seldom possible to arrange a personal interview with those who applied for admission to these courses, since many of them lived at a considerable distance from London ; their personality could not, therefore, be assessed. It was considered unnecessary to determine their intelligence before their applications were accepted. Admission depended merely upon the possession of an adequate educational background which in almost all cases involved full qualifications as a teacher either in kindergarten, elementary or secondary schools ; the majority had also some years of experience as teachers, many having attained a headship or other administrative posts. Since such persons had already been highly selected by their academic qualifications, it was thought that the level of intelligence required for administering the tests properly would be assured.

The tentative enquiry here described was carried out in order to ascertain to what extent efficiency in the administration of the Binet-Simon tests was influenced by the degree of intelligence possessed by the tester. A group test of intelligence (N.I.I.P. Group Test 33) was given to the members of the class on the first day of each course. This was given in order to familiarize them with the test situation and give them some practice in scoring the test. It was not originally intended to make any comparison between the results of this test and the efficiency shown in administering the Binet-Simon tests. The present enquiry arose at a

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later stage when experience of several courses had suggested that it might be worth while.

Each of the courses was conducted by two members of the Institute's staff and consisted partly of lectures and partly of supervised practical work on children. This practical work involved four or five two-hour periods during which each supervisor was responsible for watching half the class. At the end of each practical period the supervisors made notes regarding the personality, testing procedure and accuracy of each member of the class. The two supervisors worked on alternate periods with each half of the class so that each supervisor saw each member of the class two or three times.

At the end of each course the supervisors in discussion estimated the efficiency of each member of the course and graded them on a five point scale as follows :

A=good.

B=satisfactory.

C=fair.

D=poor.

E=very poor.

II.—LACK OF UNIFORMITY OF CONDITIONS.

It must be admitted that the investigation was not carried out under strict experimental conditions and the results obtained can only be regarded as suggestive of possible lines of worth-while research. Had the present enquiry been contemplated at the time the earlier courses were being held, the conditions would have been kept more uniform, though strict uniformity would not have been compatible with the needs of the courses.

The following variations in procedure may, perhaps, be borne in mind.

The writer was, throughout all the courses, one of the two supervisors, but the second supervisor was not always the same. It seems probable that the continuous presence of the one supervisor has kept the standard of the efficiency grading fairly consistent.

The Group Test 33 given on the first day of the course was corrected first by the students themselves and subsequently checked by one or other of the supervisors. Only in the last of the eight courses concerned, when this enquiry was already in progress, was the Group Test 33 administered and checked by someone else and the marks not actually seen by the supervisors until after the grading for efficiency had been made. The students were, however, at the time of the group test entirely unknown to the supervisors and were a mere list of names. The list of marks

obtained in the group test was put away and not referred to again during the course. With very few exceptions there was no conscious recollection of the marks obtained by any individual student at the time the grading for efficiency was made.¹

Of the eight courses four were sessional courses held weekly over a period of four and a half months ; the other four were vacation courses held for eleven consecutive days during the summer vacation. This made a few minor differences in the work of the courses, including slight differences in the hours of practical work and in the amount of time available for private study and individual discussion with the supervisors.

In the earlier courses the version of the Binet-Simon tests used was Burt's modification of the Stanford revision. In the later courses the new revision of Terman and Merrill was adopted.

III.—RESULTS.

The intelligence test (Group Test 33) given on the first day of each course, revealed that the general level of intelligence of those attending was exceptionally high, even for a group of high professional standing. No satisfactory formula has been found for translating the scores in Group Test 33 into Intelligence Quotients, but a score of 85-90 may be taken as equivalent to an I.Q. of 100. The average score for adults of secondary education is 125 ; the average for those of university education 140. Seventy per cent of the present group obtained scores of over 150 and 30 per cent scores of over 165. A comparison of these scores with the grading for efficiency given by the supervisors suggests that, even within this high range of ability, efficiency in testing may have some relationship to the score obtained in the group test.

The total number completing such courses up to the present time is 136, but of these the following were excluded from the present enquiry :

- (1) Foreign students whose test scores might not be diagnostic owing to language difficulties.
- (2) Six who had done the group test before or who had some previous acquaintance with it ;
- (3) A few who, owing to absence on the first day of the course, had missed the intelligence test ;
- (4) Fifteen who had attended a course in which a different group test was used.

The final number of individuals left after the exclusion of these is 106.

¹ Had the war not intervened by causing the temporary cessation of the courses it was intended to carry on with the procedure adopted in the last course. The suspension of the courses decided the writer to use the material collected at the earlier stage.

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(a) *Average Group Test 33 score for each efficiency grade.*

The average score obtained in the group test by those in each grade of efficiency was first investigated (Table I).

TABLE I.

<i>Testing Efficiency.</i>	<i>Mean Score in Intelligence Test.</i>	<i>No. of Cases.</i>	<i>Range of Scores.</i>
A	170.4 \pm 2.21	17	187 —140
B	161.1 \pm 1.99	20	182 —122.5
C	154.6 \pm 1.66	40	186 —114
D	154.1 \pm 2.03	17	172 —134.5
E	144.0 \pm 2.27	12	160.5 —128
A+B+C	159.7 \pm 1.19	77	187 —114
D+E	149.9 \pm 1.65	29	172 —128

It will be seen that there is a definite tendency for the intelligence test score to decrease with a decrease in the efficiency at testing. The difference between these means is shown in Table II.

TABLE II.

<i>Difference between Grades.</i>	<i>Difference between Mean Scores.</i>	<i>P.E.</i>	<i>Difference \div P.E.</i>
A—B	9.3	2.98	3.1
A—C	15.8	2.77	5.71
A—D	16.3	3.00	5.43
A—E	26.4	3.22	8.2
B—C	6.5	2.59	2.5
B—D	7.0	2.83	2.47
B—E	17.1	3.02	5.66
C—D	0.5	2.62	0.19
C—E	10.6	2.81	3.77
D—E	10.1	3.04	3.32
(A+B+C)—(D+E) ..	9.8	2.03	4.82

It would appear from this that, while the differences between Grades B, C and D are barely significant, the differences between the other pairs are all more than three times their probable errors, and the difference between the extreme Groups A and E as much as 8.2 times its probable error. There is, therefore, a strong probability that they indicate a real relationship between the Group Test 33 score and efficiency in administering Binet tests.

(b) Coefficient of Mean Square Contingency.

In order to draw up a Contingency Table the scores obtained in the Group Test 33 by members of the courses were graded on a five-point scale as follows :

A=Top 10 per cent, i.e., 11 subjects (score range 186—176).

B=Next 20 per cent, i.e., 21 subjects (score range 175—166).

C=Middle 40 per cent, i.e., 42 subjects (score range 165—151).

D=Next 20 per cent, i.e., 21 subjects (score range 150—138).

E=Lowest 10 per cent, i.e., 11 subjects (score range 141—137).

Table III shows the Contingency Table for this five-fold classification of test score and of testing efficiency.

TABLE III.

Test Score.	Testing Efficiency.					
	A.	B.	C.	D.	E.	Total.
A	6	3	2	0	0	11
B	6	4	7	4	0	21
C	3	10	18	7	4	42
D	2	2	9	4	4	21
E	0	1	4	2	4	11
TOTAL.....	17	20	40	17	12	106

Table III shows that there is a tendency for those of high score in Group Test 33 to receive a high grading for their efficiency as testers and for those of comparatively low score in that test to receive a low grading for efficiency as testers. Obtaining the coefficient of mean square contingency from this, we get $C=.465$ (maximum possible with five-fold classification = .894).

(c) Effect of rejecting lowest 10 per cent or lowest 30 per cent of group test scores.

Investigation was also conducted into the persons who would have been rejected from the courses if the group test of intelligence had been given before admission, and all those obtaining scores below certain standards had been rejected. The results are shown in Table IV. The rejection of all those with scores below 140 would have meant rejecting approximately 10 per cent of all applicants ; while the rejection of all those with scores below 150 would have meant rejecting approximately 30 per cent of the applicants.

TABLE IV.

<i>Testing Efficiency.</i>	<i>Rejections if scores under 140 were rejected.</i>		<i>Rejections if scores under 150 were rejected.</i>	
	<i>Number.</i>	<i>Percentage.</i>	<i>Number.</i>	<i>Percentage.</i>
A	0	0	2	11·7
B	1	5	3	15·0
C	5	12·5	12	30·0
D	2	11·7	6	35·3
E	5	41·7	7	58·3

It thus appears that, if a score of 140 in Group Test 33 were taken as the lower limit for acceptance, none of those whose efficiency was graded as A would have been excluded while 41·7 per cent of the E group would have been refused admission. If a score of 150 were taken as the lower limit for admission 58·3 per cent of the E grade people would have been excluded, while we should have lost only 11·7 per cent of those of A grade efficiency.

Table V shows the distribution of the five grades of efficiency.

TABLE V.

<i>Testing Efficiency.</i>	<i>At Present.</i>		<i>If scores under 140 were rejected.</i>		<i>If scores under 150 were rejected.</i>	
	<i>Number.</i>	<i>Per cent.</i>	<i>Number.</i>	<i>Per cent.</i>	<i>Number.</i>	<i>Per cent.</i>
A	17	16·0	17	18·3	15	19·7
B	20	18·9	19	20·4	17	22·4
C	40	37·8	35	37·6	28	36·8
D	17	16·0	15	16·1	11	14·5
E	12	11·3	7	7·5	5	6·6

It appears from these tables that, even within the high level of intellectual capacity represented by the groups under consideration, there may be a definite relationship between the score obtained in the intelligence test and efficiency in administering Binet-Simon tests, in spite of the large part played by personality in the latter.

IV.—EFFICIENCY IN TESTING AFTER FURTHER PRACTICE.

It does not, of course, follow that relative proficiency at the end of a short course involving only eight to ten hours of testing is indicative of ultimate proficiency after a longer period. It might be expected that

those of higher intelligence would learn more quickly and thus become more familiar with the test instructions during the short time available ; and that by becoming more familiar they would become more at ease and more readily establish the informal atmosphere desirable for testing. It is interesting to know to what extent those obtaining higher scores on the test retain their relatively greater testing efficiency after a longer period of practice.

Little evidence is available on this point since most of those attending the courses have had no further supervision. The N.I.I.P. has, however, offered a certificate of proficiency in the administration of the tests to all those who submitted to an examination at a later stage, after they had practised the tests on a minimum of thirty children. The examination has consisted of two parts :

- (1) The submission of case papers of children tested alone, from which the examiners assessed the accuracy of the candidate's scoring of the responses and soundness of the conclusions drawn.
- (2) The testing of a child in the presence of the examiners, from which the latter assessed the candidate's ability to create the right atmosphere and his or her accuracy in test procedure and verbal instructions.

It was thought that this examination might form a better criterion of the individual's proficiency as a tester than the judgments made at the time of the course. No time limit is set for the date of the examination, so that each person has the opportunity of as much experience as he or she needs before being examined.

Unfortunately, a large proportion of those attending the courses has not, as yet, sat for the examination, while several of those who have been examined were among those whom it was found necessary for reasons given on page 137 to exclude from the statistical data. We were thus left with a group of only twenty on whom the enquiry could be made.

With this small group the correlation worked by the rank method gives :

Group Test 33 score and practical examination. $r = .588$, P.E. .098

Group Test 33 score and case studies $r = .064$, P.E. .145

This suggests that, so far as this small group of persons is concerned, proficiency in the practical administration of the tests showed a closer relationship to the score obtained in the intelligence test than did the tester's assessment of the child's responses and interpretation of the results of testing, the latter being insignificant.

V.—SUMMARY AND CONCLUSION.

Undoubtedly personality plays a large part in efficiency in testing children with the Binet-Simon scale ; a high level of intelligence is not in itself a sufficient guarantee that a person is suitable for administering these tests. This enquiry, however, suggests that, even among those of exceptionally high intelligence, efficiency in the administration of the Binet tests does bear some relation to the level of intelligence of the tester, as measured by the N.I.I.P. Group Test 33.

This test was administered to 106 persons attending instruction courses in the administration of the Binet tests. These persons were afterwards graded by the supervisors according to their efficiency in giving tests to children, taking into account their general attitude and creation of the right atmosphere as well as accuracy in actual test procedure and verbal instructions. The following results were found :

- (1) The average intelligence test score for each grade of estimated efficiency showed a steady decline with a decline in efficiency.
- (2) The rejection from the courses of all those obtaining less than a certain minimum score on the Group Test 33 would result in a distinct, though not high, improvement in the distribution of testing efficiency. Taking a score of 140 as the minimum level for acceptance to the courses (a score well above the average (125) for adults of secondary education as a whole), 41·7 per cent of those who were considered by the supervisors as " very poor " in testing ability would have been rejected, while not a single person who was considered as a " good " tester would have been lost. If, on the other hand, 150 were taken as the minimum score for acceptance, 58·3 per cent of the " very poor " group would have been rejected, but 11·7 per cent of those of high grade efficiency would also have been lost.
- (3) A correlation of $\cdot588 \pm \cdot098$ was found between the score in Group Test 33 and proficiency in the practical administration of Binet-Simon tests after practising the latter on thirty or more children. The correlation between the score on Group Test 33 and the interpretation and use of Binet-Simon test results was insignificant.

A COMPARATIVE INVESTIGATION INTO THE FACTORS INVOLVED IN MATHEMATICAL ABILITY OF BOYS AND GIRLS.

By A. M. BLACKWELL.

PART I.

- I.—*The purpose of the investigation.*
- II.—*A review of past researches.*
- III.—*The test experiment.*
 - (a) *A preliminary experiment to estimate the possibilities of the Rogers' Test for use in the present investigation.*
 - (b) *The tests : general plan.*
 - (c) *The administration of the tests.*
- IV.—*The results and their statistical analysis.*
 - (a) *The Intercorrelations.*

I.—THE PURPOSE OF THE INVESTIGATION.

THE aim of the experiment was to isolate, to interpret, and to compare the mental components of the mathematical ability of boys and girls in the age range of $13\frac{1}{2}$ to 15 years, and to try to estimate their significance, by subjecting the results obtained from a battery of tests to factorial analysis.

II.—A REVIEW OF PAST RESEARCHES.

A survey of the published results of researches as to the nature of mathematical ability reveals two interesting facts. First, that attention has been focussed more on the problem of the structure of mathematical ability than on the nature of mathematical thinking and functioning. Second, that the majority of the earlier experiments have been carried out with children between the ages of 11 and 13 years, relatively little having been done with older children in whom mathematical ability might reasonably be assumed to be not only more highly developed, but more structurally organized, and with whom therefore more definite and positive results should be obtained.¹

It seems clear that mathematical ability involves not only mental processes specific to mathematics, but also intellectual abilities common to all learning; and that, in particular, it is closely related to intelligence. This is shown by the general agreement as to the existence in all mathematical operations of a central factor, called variously *g*, "the common factor," "mathematical intelligence," "abstract intelligence," "noetic capacity," although there is a certain lack of clarity as to the actual nature of its function.

¹ The work of HILDA OLDHAM and of F. W. MITCHELL are exceptions.

Evidence of a factor specific to arithmetic, and distinct from this *g* factor has been found by Judd¹, Burt², Collar³, Spearman⁴, Fouracre⁵ and Oldham⁶, as opposed to the results of Howell⁷, Stone⁸, Courtis⁹, Thorndike¹⁰ and others, who contend that in arithmetic two different factors are operative, reasoning and mechanical computation respectively, and that a single arithmetical ability does not exist.

The presence of a specific factor which operates in geometry is suggested by the results of Brown¹¹, Rogers¹², Fouracre¹³, Spearman¹⁴ and Oldham¹⁵. This spatial factor, specific to tests of geometry, is also indicated by the results of Line¹⁶, Kelley¹⁷, Koussy¹⁸, Mitchell¹⁹ and Thurstone²⁰, although the *o* factor of Mitchell has a wider range than the *h* of Koussy. It must, however, be remembered in this connection that both Spearman and Cameron²¹ suggest that sex difference in spatial tests may be "a matter of training, depending more on environmental than on innate conditions."

A factor specific to algebraic tests, and unconnected with those operating in tests of geometry, is supported by the work of Judd²², of Rogers²³, and of Oldham²⁴.

With regard to a specific logical or reasoning factor, Spearman's work gives some evidence of it. Murdock²⁵ claims to have isolated it, and although Kelley gives no indication of finding it, yet his fourth factor may be related to it.

Finally a verbal factor is suggested by Kelley, Alexander²⁶ Thurstone and Mitchell.

- ¹ JUDD, C. A.: *The Psychology of High School Subjects*, New York, 1915.
² BURT, C.: *Educational Abilities*, p. 58. ³ COLLAR, D. J.: "A Statistical Survey of Arithmetical Ability," *Brit. Journ. Psych.*, vol. XI, 1920, p. 135. ⁴ SPEARMAN, C.: *The Abilities of Man*, Macmillan, 1927. ⁵ FOURACRE, L.: "Psychological Tests of Mathematical Ability," *Forum of Education*, vol. IV, 1926. ⁶ OLDHAM, H. W.: "A Psychological Study of Mathematical Ability, with special reference to School Mathematics," *Brit. Journ. Educ. Psych.*, vol. 7, part III; vol. 8, part I.
⁷ HOWELL, H. B.: *A Foundational Study in the Pedagogy of Arithmetic*, New York, 1914, p. 147. ⁸ STONE, C. W.: "Arithmetic Abilities," *Journ. Educ. Psych.*, 1910, vol. I, pp. 608 et seq. ⁹ COURTIS, S. A.: *Journ. Educ. Psych.*, 1910, vol. I, p. 610.
¹⁰ THORNDIKE, E. L.: *The Psychology of Arithmetic*, New York, 1922.
¹¹ BROWN, W.: "The Psychology of Mathematics," *Child Study*, VI. ¹² ROGERS, A. L.: *Experimental Tests of Mathematical Ability and their Prognostic Value*, Teachers Coll., Col. Univ., No. 89. ¹³ FOURACRE, L.: *Op. cit.* ¹⁴ SPEARMAN, C.: *Op. cit.* ¹⁵ OLDHAM, H. W.: *Op. cit.* ¹⁶ LINE, W.: "The Growth of Visual Perception in Children," *Brit. Journ. Psych.*, Mon. 15. ¹⁷ KELLEY, T. L.: *Crossroads in the Mind of Man*, Stanford Univ. Press, 1928. ¹⁸ KOUSSY, A. A.: "The Visual Perception of Space," *Brit. Journ. Psych.*, Mon. 20. ¹⁹ MITCHELL, F. W.: *Mathematical Thinking*, Unpublished Ph. D. thesis, 1937, Univ. of L. library.
²⁰ THURSTONE, E. L.: *Primary Mental Abilities*, Psychometric monographs, No. 1, 1937. ²¹ CAMERON, A. E.: "A Comparative Study of the Mathematical Ability of Boys and Girls in Secondary Schools," *Brit. Journ. Psych.*, vol. XVI, 1925. ²² JUDD, C. A.: *Op. cit.* ²³ ROGERS, A. L.: *Op. cit.* ²⁴ OLDHAM, H. W.: *Op. cit.* ²⁵ MURDOCK, J. H.: *The Psychology of Reasoning*, Unpublished Ph.D. thesis, 1933, Univ. of L. Library.
²⁶ ALEXANDER, W. P.: "Intelligence, Concrete and Abstract," *Brit. Journ. Psych.*, Mon. supp. XXIX.

III.—THE TEST EXPERIMENT.

(a) *A preliminary investigation to estimate the possibilities of the Rogers' Test for use in the present investigation.*

In view of the important part played by the tests in a psychological investigation it was originally intended to use for this factorial study a standardised test, and the Rogers' Test of mathematical ability was selected. It was thought advisable, however, to carry out a preliminary experiment, and by correlating the scores obtained in the tests with the school marks in each particular subject to determine the degree of correspondence between the two. A high correlation coefficient would be taken as evidence that the results obtained provided reliable data as to the performance in any particular test, whereas a low correlation coefficient would indicate unreliable data unsuitable for use in the statistical analysis.

The Rogers' sextet is specifically designed "to measure the mathematical intelligence of pupils who have had five months of formal algebra and no formal geometry: that is, to gauge the mathematical capacity of pupils in their ninth school year."¹ It can be seen therefore that owing to the essential differences in the organization of mathematics in American and English schools, the problem of finding the optimum stage in the school course for the application of the test is one of considerable difficulty. After preliminary experiments with children at various stages in the school it was finally decided to test children who had had a year's study of formal geometry and two years' study of formal algebra.

The test was given to 103 boys and 115 girls in six London secondary schools in November and December, 1936. The low correlation coefficients obtained with test and school results, however, made it apparent that this test battery cannot be regarded as providing a satisfactory guide to the mathematical ability of English school children.

It was therefore decided to draw up an original battery of tests for this purpose.

(b) *The tests: general plan.*

Bearing in mind the results which emerged from the preliminary investigation with the Rogers' Test, and the fact that the value of the resulting data is determined pre-eminently by the nature of the tests themselves, by their purity, significance, reliability and interpretability, it was decided to devote particular attention to assembling a representative battery, and to include in it only those tests which were considered capable of reasonable interpretation, and whose reliabilities were found to be higher than 0.75.

¹ *Rogers' Tests of Mathematical Ability*—General Directions to Examiners.

In preparing this battery the tests were devised so as to include those mental abilities which would theoretically be expected to be the main factors in mathematical ability, and an attempt was made to construct each test to measure only one of these specific abilities.

The mental components of mathematical ability might theoretically be thought to include the power to analyse a given situation, to abstract its essential features, realize its implications and to make inferences from them ; the power to distinguish relevant from irrelevant data ; the ability to understand and use words and symbols, to manipulate abstract qualities without concrete aids ; to compare, classify and manipulate numerical, verbal and spatial data and to arrange them in a logical sequence ; exactness and precision ; the power to apply general principles to particular cases, to deduce from given data facts not explicitly stated, to generalize and to think clearly in terms of ideas and concepts ; finally, and to a lesser extent, facility and accuracy in numerical computation.

The tests drawn up to test these abilities are as follows :

(i) *Arithmetic reasoning*, devised to test deductive reasoning, the ability to solve problems in arithmetic, and " the power to apply number to the situations of daily life in which the need for number arises."¹

(ii) *A missing number test*, similar to the interpolation test of Dr. Rogers which she found " highly symptomatic of mathematical ability,"² devised to test the power to analyse a given situation, to abstract its essential features, realize its implications and make inferences from them.

(iii) *An algebraic computation and reasoning test*, designed to test the ability to understand and to use symbols intelligently and readily, to manipulate abstract qualities without concrete aids.

(iv) *Spatial tests*, three in number, to estimate the ability to perceive spatial relationships, and to manipulate spatial data.

(v) *Geometry tests*, also three in number :—

- (1) *True and false statements*, to test the ability to distinguish between geometrical truths and fallacies, to select those which are always true from those true only in particular cases.
- (2) *Converses*, to test the power to think clearly in terms of geometrical concepts, to perceive the fundamentals in a given statement, and to express its converse in a precise form.
- (3) *Problems*, to test the powers of applying general principles to specific cases, and of deductive reasoning.

Finally, five *verbal tests*—the selection and rejection of words, the selection of words in contexts, analogies, sequences, and mixed relations,

¹ BRUECKNER, L. T.: *Diagnostic and Remedial Teaching in Arithmetic*, Philadelphia, 1930, p. 259.

² ROGERS, A. L.: *Op. cit.*, p. 85.

complete the battery. These tests were planned somewhat differently from those commonly used to test general linguistic ability. The chief difference lies in the limitation of the test material to exercises designed to test those particular skills which would appear to exist in mathematical ability, and which have some correspondence with certain types of skill in mathematics. The verbal abilities which these tests are designed to measure are as follows :—

(vi) *The test of selection and rejection* is designed to test the ability to exclude irrelevant from logically connected matter, an ability essential to all problem work in mathematics.

(vii) *The selection of words in contexts* is a test of precision, of exactness, of the ability to select the most exact terms from a group of words all of which approximate to the precision required by the context ; and, of all the verbal tests, it is the only one which attempts to estimate the pupil's sensitivity to verbal usage.

(viii) *The analogies test* tests the ability to perceive a relationship between one word and another, and to state the nature of that relationship by completing a suggested analogy. This seems to have a distinct parallel in ratio and proportion work in mathematics, and in all work on congruence and similarity in geometry.

(ix) *The sequences test* is devised to test the ability to perceive a logical order or sequence, the power to manipulate verbal data so as to arrange them in this logical sequence. This ability is called into play in counting, in the series in algebra, and in problem work in geometry where the different stages of an argument have to be selected and arranged in a logical order.

(x) Finally, the *mixed relations test* (entirely different in character from that of Dr. Rogers designated by the same name) devised to test the ability to retain given data in a precise form, and to deduce from it, with a minimum of time, facts not explicitly stated ; a skill essential to all problem work in mathematics.

Whilst no claim is put forward that these verbal tests test all such forms of linguistic ability as might be discovered to correlate with ability in mathematics, an attempt has at least been made to isolate those types of ability in language work which appear to be included in mathematical ability, and which seem to have a clear parallel in mathematical work. The charge of failure to test as wide a field of linguistic ability as other tests are concerned to do, can be rebutted only by the counter charge that no language tests yet devised are able, in fact, to test all the abilities comprehended in the general power to wield words, and in sensitivity to verbal usage.

A period of six months was devoted to the preparation of the battery, and, during this time, tests were given in their preliminary stages to 360 children—boys and girls—in eight secondary and central schools in and near London, until after successive revisions they were drawn up in their final form.

(c) *The administration of the tests.*

The tests, arranged in order in four groups, each occupying one school period, were given in the autumn term of 1937 to 165 girls and 142 boys, in six London secondary schools, at the beginning of their third year of algebra and second of formal geometry. The age range was $13\frac{1}{2}$ to 15 years. The scores of 62 children who fell outside these age limits were discarded, as were those of 33 children who, through absence, failed to complete the battery. In addition the scores of four boys and of eight girls were ignored, in order to obtain equal numbers of boys and girls with approximately the same average age. The completed scores of 200 pupils between the ages of $13\frac{1}{2}$ and 15 years (100 boys with an average age of 14 years 3 months, and 100 girls with an average age of 14 years 4 months) were used for the statistical analysis. The tests were given not only to the A divisions of parallel classes, but in most schools where divisions existed all the children at the same stage took the test, so that the final selection is thought to be representative of children between these limits. The times were controlled rigorously with a stop watch, and these are tabulated in Table I below.

TABLE I.—TEST TIMES.

	Test.	Time for explanation.	Test time.	Total time.
		mins.	mins.	mins.
1	Arithmetic reasoning		22	22
2	Missing numbers	$\frac{1}{2}$	10	$10\frac{1}{2}$
3	Algebraic computation and reasoning		18	18
4	Spatial (1)	2	11	13
	(2)	1	4	5
	(3)	2	7	9
5	Geometry (1)	$\frac{1}{2}$	4	$4\frac{1}{2}$
	(2)	1	5	6
	(3)	$\frac{1}{2}$	20	$20\frac{1}{2}$
6	Selection and rejection	1	7	8
7	Selection of words in contexts	$\frac{1}{2}$	4	$4\frac{1}{2}$
8	Analogies	$\frac{1}{2}$	6	$6\frac{1}{2}$
9	Sequences	2	8	10
10	Mixed relations	—	3	3

Total time for administering the complete battery :
140 $\frac{1}{2}$ minutes = 2 hours 20 $\frac{1}{2}$ minutes.

The order and the grouping of the tests was as follows:—

<i>Group</i> I.	Spatial (1)	13 minutes.
	Sequence.....	10 „
	Geometry (1).....	4½ „
	Analogies	6½ „
	TOTAL	34 „
<i>Group</i> II.	Arithmetic	22 minutes.
	Spatial (3)	9 „
	Selection of words in context	4½ „
	TOTAL	35½ „
<i>Group</i> III.	Geometry (3).....	20½ minutes.
	Missing numbers	10½ „
	Spatial (2)	5 „
	TOTAL	36 „
<i>Group</i> IV.	Algebra	18 minutes.
	Selection and rejection	8 „
	Geometry (2)	6 „
	Mixed relations	3 „
	TOTAL	35 „

IV.—THE RESULTS AND THEIR STATISTICAL ANALYSIS.

The tests were marked by allowing one mark for each correct item. The correlation coefficients obtained by correlating the three geometry tests against each other were high enough to justify grouping these three tests together; and for a similar reason the three spatial tests were grouped together.

(a) *The Intercorrelations.*

The factorial analysis requires first the intercorrelations of the test results. The test results of 100 boys and 100 girls were therefore correlated with each other, using the Pearson product—moment formula.

The correlation matrices are given in Tables II and III.

TABLE II.—CORRELATION MATRIX (GIRLS).

<i>Test</i>	1	2	3	4	5	6	7	8	9	10
1	—	.567	.542	.418	.550	.527	-.005	.261	.356	.086
2	.567	—	.339	.310	.320	.274	.047	.377	.192	.057
3	.542	.339	—	.453	.556	.350	.065	.482	.229	.144
4	.418	.310	.453	—	.376	.403	.241	.279	.765	.179
5	.550	.320	.556	.376	—	.449	.077	.527	.447	.050
6	.527	.274	.350	.403	.449	—	.262	.481	.530	.213
7	-.005	.047	.065	.241	.077	.262	—	.284	.321	.328
8	.261	.377	.482	.279	.527	.481	.284	—	.489	.104
9	.356	.192	.229	.765	.447	.530	.321	.489	—	.173
10	.086	.057	.144	.179	.050	.213	.328	.104	.173	—

TABLE III.—CORRELATION MATRIX (BOYS).

<i>Test</i>	1	2	3	4	5	6	7	8	9	10
1	—	.496	.547	.471	.640	.246	.312	.360	.374	.188
2	.496	—	.451	.262	.416	.167	.296	.324	.184	.137
3	.547	.451	—	.481	.639	.300	.276	.512	.376	.215
4	.471	.262	.481	—	.522	.348	.623	.572	.385	.246
5	.640	.416	.639	.522	—	.125	.299	.453	.407	.214
6	.246	.167	.300	.348	.125	—	.213	.388	.368	.280
7	.312	.296	.276	.623	.299	.213	—	.433	.481	.178
8	.360	.324	.512	.572	.453	.388	.433	—	.467	.256
9	.374	.184	.376	.385	.407	.368	.481	.467	—	.222
10	.188	.137	.215	.246	.214	.280	.178	.256	.222	—

A preliminary inspection of these matrices reveals the fact that all the correlations are positive or zero, the only negative one, $-.005$, approximating to zero. Tests whose correlations are zero are usually of a restricted range of content¹, and it is particularly noticeable that whilst the correlation matrix of the boys contains no zero correlation those in the girls' are restricted to two specific tests—the selection of words in contexts and mixed relations. This would seem to indicate that only relatively insignificant data will emerge from these two tests.

The correlation matrices obtained from the boys' and girls' results were then factored by Thurstone's centroid method², and after each factor, the residuals were studied to ascertain if additional factors should be extracted.

The raw factors obtained, correct to three decimal places, are given in Tables IV and V.

TABLE IV.—FACTORIAL MATRIX (GIRLS).

FACTOR LOADINGS DETERMINED BY THURSTONE'S CENTROID METHOD.

Test.	I.	II.	III.	IV.	Communality (h^2)
1	.659	+.381	-.304	+.238	.7285
2	.520	+.323	-.073	+.244	.4396
3	.633	+.313	-.052	+.070	.5063
4	.714	-.336	-.454	-.020	.8292
5	.666	+.304	-.071	-.205	.5830
6	.685	+.008	+.160	-.119	.5090
7	.332	-.379	+.349	+.045	.3776
8	.649	+.153	+.273	-.247	.5801
9	.727	-.372	-.130	-.402	.8454
10	.283	-.297	+.239	+.316	.3254

¹ THURSTONE, L. L.: *Primary Mental Abilities*, Psychometric monographs, No. 1. Univ. of Chicago Press, 1937. p. 60.

² THURSTONE, L. L.: *A simplified factor analysis and an outline of the Computations*. Supplement to the *Theory of Multiple Factors*. Distributed by the University of Chicago Bookstore. 1933.

TABLE V.—FACTORIAL MATRIX (BOYS).

FACTOR LOADINGS DETERMINED BY THURSTONE'S CENTROID METHOD.

<i>Test.</i>	<i>I.</i>	<i>II.</i>	<i>III.</i>	<i>Communality (h^2)</i>
1	+·698	+·349	+·082	·6157
2	+·511	+·371	+·180	·4311
3	+·725	+·283	—·209	·6494
4	+·740	—·198	+·195	·6248
5	+·711	+·352	—·061	·6331
6	+·445	—·321	—·255	·3660
7	+·610	—·315	+·402	·6329
8	+·708	—·188	—·127	·5527
9	+·612	—·211	—·131	·4362
10	+·362	—·148	—·161	·1788

The derived correlations, the sums of the products of the factor loadings of the tests taken in pairs, are given in Tables VI and VII.

TABLE VI.—THE DERIVED CORRELATION MATRIX (GIRLS).

<i>Test</i>	1	2	3	4	5	6	7	8	9	10
1	—	·546	·569	·476	·528	·377	—·020	·344	·281	·075
2	·546	—	·451	·290	·399	·318	·037	·306	·169	·111
3	·569	·451	—	·370	·507	·421	·076	·427	·323	·096
4	·476	·290	·370	—	·410	·415	·205	·293	·711	·187
5	·528	·399	·507	·410	—	·471	·072	·511	·462	·016
6	·377	·318	·421	·415	·471	—	·275	·519	·522	·192
7	—·020	·037	·076	·205	·072	·275	—	·241	·319	·304
8	·344	·306	·427	·293	·511	·519	·241	—	·479	·126
9	·281	·169	·323	·711	·462	·522	·319	·479	—	·158
10	·075	·111	·096	·187	·016	·192	·304	·126	·158	—

TABLE VII.—THE DERIVED CORRELATION MATRIX (BOYS).

<i>Test</i>	1	2	3	4	5	6	7	8	9	10
1	—	.501	.588	.432	.614	.178	.349	.418	.342	.188
2	.501	—	.437	.340	.483	.062	.267	.269	.211	.101
3	.588	.437	—	.440	.628	.285	.269	.487	.411	.256
4	.432	.340	.440	—	.444	.343	.591	.536	.469	.266
5	.614	.483	.628	.444	—	.219	.298	.445	.369	.215
6	.178	.062	.285	.343	.219	—	.269	.407	.373	.250
7	.349	.267	.269	.591	.298	.269	—	.440	.386	.203
8	.418	.269	.487	.536	.445	.407	.440	—	.490	.304
9	.342	.211	.411	.469	.369	.373	.386	.490	—	.274
10	.188	.101	.256	.266	.215	.250	.203	.304	.274	—

(Part II of this article will appear in the next number).

THE SECONDARY SCHOOL CAREERS OF CHILDREN NOT RECOMMENDED BY HEADS OF THEIR ELEMENTARY SCHOOLS.*

BY H. ALEC EVANS

(*From the Education Department, University of Birmingham*).

- I.—*Object of the investigation.*
- II.—*Method of making the investigation.*
- III.—*Performance of non-selected children in the admission examination.*
- IV.—*Performance of non-selected children at the end of the first year in the secondary school. Entry 1926-1928.*
- V.—*Difference between boys and girls.*
- VI.—*Performance of non-selected children entering 1929-1931.*
- VII.—*Performance of non-selected children in the fourth year at the secondary school.*
- VIII.—*Did successful non-selected children come from certain elementary schools?*
- IX.—*Review of preceding results.*
- X.—*Comparison of performance in admission examination with performance in the secondary school.*
- XI.—*Performance in secondary schools of non-selected children who only just passed the admission examination.*
- XII.—*Conclusions.*
- XIII.—*Summary.*

I.—OBJECT OF THE INVESTIGATION.

IN the admission of children to the secondary schools of a large city it has been the custom for the head teachers of the elementary schools to report on the suitability of their children for a secondary school education. This forecast by the head teachers has acted in some measure as a preliminary selection, for where a child was not on the recommended list of the head teachers, no pressure was brought to bear on the parents to allow the child to sit for the admission examination. In this way a certain number of non-selected children did not sit for the examination. A large number, however, did take the examination; while many of

*Based on a thesis accepted as part qualification for the degree of M.A. in Education, University of Birmingham, 1938.

them failed, some succeeded in gaining admission to the secondary schools of the city.

To take a typical year : in 1936 we find that 3,221 who had been selected as likely to benefit by a secondary school education took the examination. Of these children 16 per cent reached the authority's maintenance allowance standard ; 62·8 per cent were below maintenance allowance standard but reached admission standard ; and 21·2 per cent failed to pass the examination. The figures for the non-selected children—that is, the children not selected by the head teachers of the elementary schools as likely to benefit by secondary school education—are surprisingly different. 1,981 non-selected children sat for the examination ; only 1·1 per cent reached maintenance allowance standard ; 30·4 per cent were below maintenance allowance standard but reached admission standard ; and 68·5 per cent failed to pass the examination.

We can see from these figures that the verdict of the examination agrees with the recommendation of the head teachers for a very large proportion of the candidates. Of those whom the head teachers selected only 21·2 per cent failed the examination, while of those whom the head teachers had not selected 68·5 per cent failed to pass.

What of those who were not recommended but who passed the admission examination ? Did they justify their admission to the secondary school ?

An investigation into this question is well worth while. Dissatisfaction with the present means of admission to secondary schools is widespread. Professor Valentine, for example, came to the conclusion that even in the most favourable circumstances " the evidence suggested that one-third of the pupils accepted on the examination should have been replaced by the best pupils among those who failed."¹ If we paid more attention to the recommendations of the head teachers, should we succeed in rejecting the unsuitable pupils who are at present passing the admission examination ? Could we extend the use to be made of the head teachers' recommendations by using them as a check in borderline cases ? The results of the examination are in agreement with the recommendations in such a large proportion of cases that it may be that the head teachers' selection is right, and the examination is wrong in admitting the non-selected pupils to the secondary schools.

II.—METHOD OF MAKING THE INVESTIGATION.

A large educational authority in the Midlands had expressed the wish that the enquiry should be made, and undertook to provide the

¹ C. W. VALENTINE : *Examinations and the Examinee*, p. 9, 1938.

necessary figures. In the first place lists of non-selected pupils (as we shall henceforth label the children not recommended for a secondary school education by the head of their elementary school) were drawn up and submitted to the head masters and head mistresses of twenty-one secondary schools—counting boys' and girls' departments of co-educational schools as separate schools. The heads were asked to give the positions of these pupils in the group with which they were admitted at each stage of their secondary school education. From the replies of these twenty-one secondary schools six had to be rejected as being unsuitable; some schools were unable to give full returns; in others the children were divided at entrance into separate groups not subsequently examined together. In all, the careers of 1,273 non-selected and 5,706 selected pupils were studied.

If the head teachers were right in not recommending these children as likely to benefit by a secondary school education, we should expect to find them at the bottom of the lists in the results of the examinations held during the course of their secondary school career, and possibly also at the bottom of the list of successful candidates in the admission examination, for it may be that the apparent difference between the head teachers' recommendation and the admission examination is that the line for admission is placed higher by the head teachers than by the examination, so that were fewer children admitted to the secondary schools, the majority of the non-selected pupils would be rejected by the examination.

In order to have a convenient means of tabulating the performance of the non-selected children and to be able to compare their work with that of the selected, the following method was adopted: the whole of the children admitted at the same time to a given secondary school were divided into four equal groups. Thus if one hundred children entered a given secondary school in one year, there would be twenty-five in each group. The top 25 per cent we shall refer to throughout this paper as Group I, the second 25 per cent as Group II, and so on. Having arranged the children in this way it is an easy matter to inspect each group and to tabulate the number of selected and non-selected children respectively in each of the groups.

It is clear that if the non-selected children were an average sample we should find them fairly evenly scattered over the four groups; if, on the other hand, they were inferior to the selected, we should find them mainly in the bottom group, i.e., Group IV.

III.—PERFORMANCE OF NON-SELECTED CHILDREN IN THE ADMISSION EXAMINATION.

We have already seen that the non-selected children did very much worse in the admission examination than those who had been recommended by the elementary head teachers. We are here concerned only with those non-selected children who were successful in the admission examination and passed on to the secondary schools. The figures are given in Tables I and II.

We can see at a glance that even those non-selected children who passed the admission examination were classed by the examination as far below the average of the selected children; 27·6 per cent of the boys were found in Groups I and II, i.e., were classed by the examination as above the average of the whole group of entrants; 72·4 per cent came into the two bottom groups, 40·8 per cent being in the lowest group, as against only 7 per cent in the highest group. The figures for the girls are similar: 30·8 per cent were classed as being above the average of the whole group, and 69·2 per cent as below the average; 38·4 per cent of the girls came into the lowest group, as against 8·1 per cent in the top group.

But while we can see that on the whole the non-selected are below the level of the selected, yet a number of them did very well indeed, so that 7·0 per cent of the boys and 8·1 per cent of the girls are found among the top 25 per cent of those admitted to the secondary schools. The question at once arises: do these non-selected children justify their admission? This question we shall seek to answer by an analysis of their performance in the work of the secondary schools, and to it we now turn.

TABLE I.

DISTRIBUTION OF NON-SELECTED BOYS IN THE ADMISSION EXAMINATIONS. ENTRY 1926, 1927, 1928.

<i>Group.</i>	<i>No. in Group at Admission Examination.</i>	<i>Percentage in Group.</i>
I	29	7·0
II	86	20·6
III.....	132	31·6
IV	170	40·8
Totals: I and II	115	27·6
III and IV	302	72·4
GRAND TOTAL.....	417	

TABLE II.

DISTRIBUTION OF NON-SELECTED GIRLS IN THE ADMISSION EXAMINATIONS. ENTRY 1926, 1927, 1928.

<i>Group.</i>	<i>No. in Group at Admission Examination.</i>	<i>Percentage in Group.</i>
I	21	8.1
II	59	22.7
III	80	30.8
IV	100	38.4
Totals: I and II	80	30.8
III and IV	180	69.2
GRAND TOTAL.....	260	

IV.—PERFORMANCE OF NON-SELECTED CHILDREN AT THE END OF THE FIRST YEAR IN THE SECONDARY SCHOOL. ENTRY 1926-1928.

The head masters and head mistresses of the secondary schools, it will be remembered, were asked to give the positions of the non-selected pupils at the end of their first year in the secondary school. These results were analysed in the same way as those of the admission examination, i.e., by dividing the whole of those examined together at the end of the year into four equal groups and then tabulating the number of selected and non-selected children in each of the groups. If the head teachers of the elementary schools were right in not selecting these children for a secondary school education, then we should expect to find them at the bottom of the examinations in the secondary school, i.e., in Group IV. The results are set out in Tables III, IV and V, Table III being the results for the boys, Table IV for the girls, and Table V a summary of boys and girls together. These tables show that in the examinations at the end of the first year in the secondary schools the non-selected children as a group were not so good as the selected. Thus (see Table V), whereas only 12 per cent of the non-selected children came into Group I, 28 per cent of the selected children came into this group; 35.4 per cent of the non-selected children came into Groups I and II, while 53.5 per cent of the selected children were in these two groups.

A significant fact, however, is that 12 per cent of these non-selected children should come into Group I, i.e., among the top 25 per cent of the whole group of children; out of 585 children who were not classed by the head teachers as likely to benefit by a secondary school education but

who passed the admission examination, seventy-one at the end of the first year in the secondary school were placed among the top 25 per cent of all the children admitted at the same time. Two hundred and seven—35 per cent—of them actually succeeded in reaching a position at least half-way up the examination list.

TABLE III.

DISTRIBUTION OF SELECTED AND NON-SELECTED BOYS AT THE EXAMINATIONS HELD AT THE END OF THE FIRST YEAR AT THE SECONDARY SCHOOL. ENTRY 1926, 1927, 1928.

<i>Non-Selected.</i>			<i>Selected.</i>	
<i>Group.</i>	<i>No. in Group.</i>	<i>Percentage in Group.</i>	<i>No. in Group.</i>	<i>Percentage in Group.</i>
I	44	10.7	456½	28.7
II	91½*	22.2	409	25.7
III	112	27.2	388½	24.4
IV	164½	39.9	336	21.2
Totals: I and II .	135½	32.9	865½	54.4
III and IV .	276½	67.1	724½	45.6
GRAND TOTAL .	412		1,590	

* The "half child" is due to the impossibility of having four equal groups in all cases. A child on the border line between the groups was counted as a half in each group.

TABLE IV.

DISTRIBUTION OF SELECTED AND NON-SELECTED GIRLS AT THE EXAMINATION HELD AT THE END OF THE FIRST YEAR OF THE SECONDARY SCHOOL CAREER.

<i>Non-selected.</i>			<i>Selected.</i>	
<i>Group.</i>	<i>No. in Group.</i>	<i>Percentage in Group.</i>	<i>No. in Group.</i>	<i>Percentage in Group.</i>
I	27	15.6	226½	26.9
II	45	26.0	208½	24.8
III	49½	28.6	204½	24.3
IV	51½	29.8	202½	24.0
Totals: I and II .	72	41.6	435	51.7
III and IV .	101	58.4	407	48.3
GRAND TOTAL .	173		842	

TABLE V.
SUMMARY OF TABLES III AND IV—BOYS AND GIRLS.

<i>Non-selected.</i>			<i>Selected.</i>	
<i>Group.</i>	<i>No. in Group.</i>	<i>Percentage in Group.</i>	<i>No. in Group.</i>	<i>Percentage in Group.</i>
I	71	12.1	683	28.1
II	136½	23.3	617½	25.4
III	161½	27.6	593	24.4
IV	216	37.0	538½	22.1
Totals : I and II .	207½	35.4	1,300½	53.5
III and IV .	377½	64.6	1,131½	46.5
GRAND TOTAL .	585		2,432	

V.—DIFFERENCE BETWEEN BOYS AND GIRLS.

It will not have escaped notice that there is a marked difference between the distribution of the boys and the girls. The non-selected girls did much better than the non-selected boys in the examinations at the end of the first year in the secondary school. Of the non-selected boys, only 33 per cent were above the average, but of the girls 41.6 per cent were above the average. The number of girls is small—173 ; it may be that, if we could examine the records of more of them, we should find that these 173 were not a fair sample of the whole. Unfortunately, there were only two other girls' schools which made reliable returns. Their returns were analysed in the same way, and it was found that there was again a marked superiority of the non-selected girls over the non-selected boys. Compared with the results already given in Table IV, there were fewer girls in Group I but many more in Group II, so that 49.4 per cent of them were found to be above the average.

A detailed analysis of the figures of Table IV, year by year, showed that in each of the three years at least 40 per cent of the non-selected girls were above the average of the whole group admitted at the same time.

These figures seem to indicate that the non-selected girls tend to do better than the non-selected boys at the end of their first year in the secondary school. In other words, the recommendations of the head teachers in these schools are more accurate forecasts of the performance of the boys at the end of their first year in the secondary schools than they are for the girls.

VI.—PERFORMANCE OF NON-SELECTED CHILDREN ENTERING IN 1929-1931.

The figures we have been considering so far are for children admitted to the secondary schools in 1926, 1927 and 1928. Results for the years 1929, 1930 and 1931 were also examined. Space does not permit a detailed reproduction of the figures. It was found that the distribution of the non-selected boys was fairly constant each year. The distribution of the girls was much less steady; in each of the years 1926, 1927 and 1928, at least 40 per cent of the girls were placed above the average of the whole group; in 1929 this fell to 18 per cent, rising in the two following years to 25 per cent.¹

The total figures for the years 1926 to 1931 are given in Table VI.

TABLE VI.

DISTRIBUTION AT END OF FIRST YEAR IN SECONDARY SCHOOL OF BOYS AND GIRLS WHO ENTERED THE SECONDARY SCHOOLS FROM 1926-1931, INCLUSIVE. THE TABLE INCLUDES TABLES III AND IV.

DISTRIBUTION OF SELECTED CHILDREN IS ALSO GIVEN FOR COMPARISON.

<i>Non-selected.</i>			<i>Selected.</i>	
<i>Group.</i>	<i>No. in Group.</i>	<i>Percentage in Group.</i>	<i>No. in Group.</i>	<i>Percentage in Group.</i>
I	133	10·4	1,611½	28·2
II	268	21·1	1,476½	25·9
III	362	28·4	1,383	24·2
IV	510	40·1	1,235	21·7
Totals: I and II .	401	31·5	3,088	54·1
III and IV .	872	68·5	2,618	45·9
GRAND TOTAL .	1,273		5,706	

VII.—PERFORMANCE OF NON-SELECTED CHILDREN IN THE FOURTH YEAR AT THE SECONDARY SCHOOLS.

We now turn to another point. It is possible that the head teachers' recommendations involved factors which did not reveal themselves early in the secondary school course. The head teachers may have been far seeing. If this were the case then we should expect the number of non-selected children in the upper groups to decrease towards the end of the secondary school course with a corresponding increase in the lower groups.

¹ These differences are possibly due to a change in the age of taking the examination. The ages for admission were lowered after 1928, 1929 being a transition year.

This possibility was investigated in the same way, that is, by dividing the whole of the entrants into four equal groups, but this time on the results of work done later in the secondary school course. Unfortunately, it was not possible to utilize the results from all the schools concerned in the first part of the investigation. Owing to divergence of courses it was often impossible to obtain comparable results for all the children who entered at the same time. It was possible, however, to compare the work in the fourth year of 435 of the non-selected children whose positions were analysed at the end of the first year in the secondary school. If these children did worse in the fourth year than in the first year, it might indicate that the head teachers' recommendations took into account factors which did not reveal themselves early in the secondary school career.

The results are set out in Tables VII, VIII and IX.

The analysis shows that a slightly greater proportion of the non-selected children who entered the secondary schools in 1926, 1927 and 1928 did come into the lower groups at the end of the fourth year. The increase, however, was small (1·9 per cent), and was due entirely to the girls. The non-selected boys, in fact, appeared to improve as the years passed, but the girls receded so much more that they swamped the improved relative performance of the boys in spite of the much smaller number of the girls.

The results for the fourth year's work were not available for entries after 1928. An analysis of the second and third year's work was therefore made in the case of children entering the secondary schools from 1929 to 1931. No marked divergence from the distribution in the *first* year was found.

TABLE VII.

DISTRIBUTION OF SELECTED AND NON-SELECTED BOYS AT THE END OF THE FOURTH YEAR. THE FIGURES IN BRACKETS ARE THE DISTRIBUTION AT THE END OF THE FIRST YEAR. SEE TABLE III. ENTRY 1926-28.

<i>Non-selected.</i>			<i>Selected.</i>	
<i>Group.</i>	<i>No. in Group.</i>	<i>Percentage in Group.</i>	<i>No. in Group.</i>	<i>Percentage in Group.</i>
I	39½	12·8 (10·7)	340½	28·1 (28·7)
II	67	21·7 (22·2)	313	25·8 (25·7)
III	84½	27·3 (27·2)	295½	24·4 (24·4)
IV	118	38·2 (39·9)	262	21·6 (21·2)
Totals: I and II .	106½	34·5 (32·9)	653½	54·0 (54·4)
III and IV .	202½	65·5 (67·1)	557½	46·0 (45·6)
GRAND TOTAL .	309		1,211	

We may conclude that there is nothing to suggest that the judgments of the head teachers of the elementary schools were more correct as to the later performance of the boys than they were as to the earlier performance in the secondary school; but that they were more correct as to the later performance of the girls.

TABLE VIII.

DISTRIBUTION OF SELECTED AND NON-SELECTED GIRLS AT THE END OF THE FOURTH YEAR. THE FIGURES IN BRACKETS ARE THE FIGURES FOR THE DISTRIBUTION AT THE END OF THE FIRST YEAR
SEE TABLE IV. ENTRY 1926-28.

<i>Non-selected.</i>			<i>Selected.</i>	
<i>Group.</i>	<i>No. in Group.</i>	<i>Percentage in Group.</i>	<i>No. in Group.</i>	<i>Percentage in Group.</i>
I	11½	9.1 (15.6)	175	28.3 (26.9)
II	28	22.2 (26.0)	158	25.5 (24.8)
III	38	30.2 (28.7)	148	23.9 (24.3)
IV	48½	38.5 (29.7)	138	22.3 (24.0)
Totals: I and II .	39½	31.3 (41.6)	333	53.8 (51.7)
III and IV .	86½	68.7 (58.4)	286	46.2 (48.3)
GRAND TOTAL .	126		619	

TABLE IX.

SUMMARY OF TABLES VII AND VIII—DISTRIBUTION OF BOYS AND GIRLS AT THE END OF THE FOURTH YEAR. ENTRY 1926, 1927 AND 1928. THE FIGURES IN BRACKETS ARE THE DISTRIBUTION AT THE END OF THE FIRST YEAR.

<i>Non-selected.</i>			<i>Selected.</i>	
<i>Group.</i>	<i>No. in Group.</i>	<i>Percentage in Group.</i>	<i>No. in Group.</i>	<i>Percentage in Group.</i>
I	51	11.7 (12.1)	515½	28.2 (28.1)
II	95	21.8 (23.3)	471	25.7 (25.4)
III	122½	28.2 (27.6)	443½	24.2 (24.4)
IV	166½	38.3 (37.0)	400	21.9 (22.1)
Totals: I and II .	146	33.5 (35.4)	986½	53.9 (53.5)
III and IV .	289	66.5 (64.6)	843½	46.1 (46.5)
GRAND TOTAL .	435		1,830	

VIII.—DID SUCCESSFUL NON-SELECTED CHILDREN COME FROM CERTAIN ELEMENTARY SCHOOLS?

A further possibility has now to be considered. It is possible that the non-selected children came mainly from elementary schools where the average ability of the children was higher than in the majority of the schools. In these circumstances head teachers might easily set a higher standard for their recommendations, so that a child from school *A* might be a non-selected pupil, while had he attended school *B* he might have been a selected pupil. The question therefore is this: Did non-selected pupils, particularly those who did well, come in the main from certain elementary schools?

To answer this question the whole of the entrants to a group of secondary schools were divided into four groups as before on the results of the examinations at the end of the first year in the secondary school, and were then re-classed according to the elementary school attended. Thus the non-selected children from any given elementary school were classified in Groups I to IV, whatever secondary school they attended.

It is impossible to reproduce here the lengthy tables giving details of the performance of children from ninety-one elementary schools. There is in them nothing to suggest that the head teachers of some of the elementary schools were setting a higher standard for their selection than one common throughout the area. To this there were only two exceptions: from only two elementary schools did there come in the years concerned a higher proportion of good non-selected boys than came from other elementary schools.

IX.—REVIEW OF PRECEDING RESULTS.

The various lines of approach to the investigation have shown that the non-selected children as a group were not so good as the selected children: in the admission examination, at the end of the first year in the secondary school, and again in the fourth year, the performance of the non-selected fell below that of the selected. The qualification "as a group" is important, for some of the non-selected children did very well indeed, and were found well up the lists in the examination.

We must here once again, however, remind ourselves that we are dealing with only a small proportion of the non-selected children—with those who succeeded in gaining admission to the secondary school. On the results of the admission examination a much larger group of the non-selected failed to do well enough to gain entrance to the secondary schools—a result in agreement with the recommendations of the head

teachers. The conclusions we reach apply only to those non-selected children who passed the admission examination. Of these children the investigation shows clearly this :

The fact that a child has not been selected by the head teacher of the elementary school as likely to benefit by a secondary school education does not prove that the child will not do well in the secondary school. The chances are, however, that even those who pass the admission examination will not do so well as the pupils who have been selected.

X.—COMPARISON OF PERFORMANCE IN THE ADMISSION EXAMINATION WITH PERFORMANCE IN THE SECONDARY SCHOOLS.

A comparison of the performance of the non-selected children in the admission examination with their performance in the examinations at the end of the first year in the secondary school shows an interesting change. We find that there was a tendency for the non-selected boys who entered the secondary schools to move up from their positions in the admission examination and to pass selected candidates with whom they were approximately bracketed equal in the admission examination. Thus, whereas 7 per cent of the non-selected boys are found in Group I in the admission examination, 10·7 per cent of the same boys are found in Group I at the end of their first year in the secondary school. There is also a slight increase in the numbers in Group II, so that at the end of the first year in the secondary school as compared with the admission examination, there is an increase of 5·3 per cent of non-selected boys who are classed as being above the average.

When we turn to the girls we find that the difference between the admission examination and the examination at the end of the first year in the secondary school is more marked : of the non-selected girls who entered the secondary schools in the years 1926, 1927 and 1928, many more were, at the end of the first year, placed above the average than were so placed in the admission examination. In Group I the increase is from 8·1 per cent to 14·3 per cent ; 44·2 per cent are classed by the secondary schools as above the average at the end of the first year ; while only 30·8 per cent were so classed by the admission examination.

It must be remembered, however, that the girls do not retain this advantage, for in the fourth year we find that the figures are much closer to those of the admission examination. Thus, there are 9·1 per cent of the girls in Group I and 31·3 per cent in Groups I and II at the end of the fourth year. (Table VIII.)

These figures seem to show that there is something—perhaps the new environment at the secondary schools—which causes some of the non-selected children to develop unexpectedly and to do better in the secondary schools than the head teachers of the elementary schools had anticipated and better than they did in the admission examination.

It has already been stated that the recommendations of the elementary head teacher acted as a preliminary selection, in so far as no pressure was brought to bear on non-selected pupils to sit the examination. The fact that they did sit was due to the keenness of their parents. Is this perhaps one reason for some of the non-selected children doing better than was expected of them? Did the keenness of the parents extend to their children's work in the secondary schools, so that individual help and encouragement acted as a stimulus to children who without it would not have done so well?

TABLE X.

DISTRIBUTION OF NON-SELECTED BOYS IN THE ADMISSION EXAMINATIONS. ENTRY 1926, 1927, 1928.

FOR CONVENIENCE OF REFERENCE THE GROUPING OF THE SAME BOYS AT THE END OF THE FIRST YEAR IN THE SECONDARY SCHOOLS IS ALSO GIVEN. THE BOYS CONCERNED ARE THE SAME AS THOSE IN TABLE III.

<i>Group.</i>	<i>No. in Group at Admission Examination.</i>	<i>Percentage in Group.</i>	<i>Percentage in Group at end of First Year in Secondary School.</i>
I	29	7.0	10.7
II	86	20.6	22.2
III	132	31.6	27.2
IV	170	40.8	39.9
Totals: I and II ..	115	27.6	32.9
III and IV .	302	72.4	67.1
GRAND TOTAL .	417*		

* The difference of five between these figures and those of Table III is due to absence at the end of the first year at the time of the examination, or to transference during the year to other secondary schools.

TABLE XI.

DISTRIBUTION OF NON-SELECTED GIRLS IN THE ADMISSION EXAMINATIONS.* ENTRY 1926, 1927 AND 1928.

FOR CONVENIENCE OF REFERENCE THE DISTRIBUTION AT THE END OF THE FIRST YEAR IS GIVEN.

<i>Group.</i>	<i>No. in Group at Admission Examination.</i>	<i>Percentage in Group.</i>	<i>Percentage in Group at end of First Year in Secondary School.</i>
I	21	8.1	14.3
II	59	22.7	29.9
III	80	30.8	30.4
IV	100	38.4	25.4
Totals: I and II..	80	30.8	44.2
III and IV..	180	69.2	55.8
GRAND TOTAL ..	260		

* This table includes the figures of Table IV and others that were obtained afterwards.

XI.—PERFORMANCE IN SECONDARY SCHOOLS OF NON-SELECTED CHILDREN WHO ONLY JUST PASSED THE ADMISSION EXAMINATION.

We may now ask whether the children who come near the bottom of the lists of successful candidates and were also non-selected children, did especially badly in the work of the secondary schools. This question may have some practical importance, for if we find that they did badly in the secondary schools, we shall have established a case for weighting the recommendations of the head teachers in such a way that those non-selected children who only just succeed in passing the admission examination shall be refused admission.

An analysis was therefore made of the positions of the non-selected children who entered the secondary schools in 1926, 1927 and 1928, and were placed in Group IV in the admission examination, i.e., among the bottom 25 per cent of successful candidates. If these children did especially badly in the work of the secondary school, it is clear that we shall find most of them in Group IV at the end of the first and fourth years in the secondary schools.

The results are given in Tables XII and XIII. They show that roughly 25 per cent of the children who were placed in Group IV in the admission examination and who were also non-selected children, were

classed by the secondary schools as being above the average of the whole group of children admitted to the school at the same time.

It follows that had the fact of non-selection, combined with a low position among those passing the admission examination, excluded these children from the secondary schools, we should have refused admission to a certain number of children who in the work of the secondary schools showed themselves to be above the average.

TABLE XII.

DISTRIBUTION OF NON-SELECTED BOYS WHO WERE PLACED IN GROUP IV IN THE ADMISSION EXAMINATION: (A) AFTER ONE YEAR; (B) AFTER FOUR YEARS IN THE SECONDARY SCHOOLS.

Group.	No. in Group after one year in Secondary School.	Percentage in Group after one year.	No. in Group after four years in Secondary School.	Percentage in Group after four years.
I	10½	4.7	8	6.9
II	37½	17.0	23	19.8
III	61½	27.8	34½	29.7
IV	111½	50.5	50½	43.6
Totals: I and II..	48	21.7	31	26.7
III and IV ..	173	78.3	85	73.3
GRAND TOTAL ..	221		116	

TABLE XIII.

DISTRIBUTION OF NON-SELECTED GIRLS WHO WERE PLACED IN GROUP IV IN THE ADMISSION EXAMINATION: (A) AFTER ONE YEAR; (B) AFTER FOUR YEARS IN THE SECONDARY SCHOOLS.

Group.	No. in Group after one year in Secondary School.	Percentage in Group after one year.	No. in Group after four years in Secondary School.	Percentage in Group after four years.
I	9	9.3	4½	8.0
II	22	22.7	12	21.4
III	31	31.9	13½	24.1
IV	35	36.1	26	46.4
Totals: I and II..	31	32.0	16½	29.5
III and IV ..	66	68.0	39½	70.5
GRAND TOTAL ..	97		56	

CONCLUSIONS.

The facts disclosed by this investigation suggest that the recommendations of the elementary head teachers are substantially valid, in that the pupils they do not select do, as a body, very badly in the admission examination; moreover, even those non-selected pupils who do succeed in gaining admission to the secondary schools are, as a body, inferior to the selected pupils. Yet the recommendations are not so reliable as to justify the rejection of the non-selected pupils who succeed in passing the admission examination, for our analysis has shown that a few of the non-selected pupils develop in a way that was not anticipated either by the examination or by the head teachers. The head teachers in their selection make, as does the examination, serious errors, which only become apparent at a later stage.

Our results provide further evidence in favour of the "argument for leaving open a door at a later stage than 11+ for transition to a secondary type of education."¹ The present investigation, particularly the figures in Tables XII and XIII, suggests that the most careful choice of which we are capable will not be perfect; that some children who at the age of 11+ do not appear to be fitted for a secondary school education, later turn out to be quite entitled to one.² This fact must be taken into account in any proposals for altering our present methods of selection for a secondary school education.

SUMMARY.

(1) The results of the admission examination show that broadly speaking the heads of elementary schools were to a very large extent correct in their estimates of those who would do satisfactorily in the examination. (Tables I and II.)

(2) At the end of the first year in the secondary school the non-selected children fell on the average below the level of the selected. Nevertheless, about one-third of the non-selected children were placed above the average of the whole group of selected and non-selected children admitted at the same time. (Tables III, IV, V and VI.)

¹ C. W. VALENTINE: *Reliability of Examinations*, p. 97, 1932; see also *Examinations and the Examinee*, p. 13. The desirability of a means of transition from the senior school at 13+ to a secondary school has recently been recommended in the Spens Report.

² Cf., I. L. KANDEL: *Examinations and their Substitutes*.—The Carnegie Foundation for the Advancement of Teaching, *Bulletin*, No. 28, 1936: "What is clear from the use of the tests is that there is no single measure for predicting educational success."

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(3) At the end of the fourth year the analysis showed a similar result. (Tables VII, VIII and IX.)

(4) With two exceptions there was little to suggest that some head teachers were setting a higher standard for their selection than one common throughout the area.

(5) There was a tendency for the non-selected children to improve on their performance in the admission examination, and, in the examination at the end of their first year in the secondary school, to pass selected children with whom they had been bracketed approximately equal. (Tables X and XI.)

(6) The performance of those non-selected children who only just succeeded in gaining admission to the secondary schools was analysed. This analysis showed that approximately 25 per cent of the non-selected children who only just gained admission were, at the end of the first year, classed by the secondary schools as being above the average of the whole group. (Tables XII and XIII.)

(7) The investigation affords further evidence in favour of leaving open a door at a later stage than 11+ for transition to some type of secondary education.

BOOK REVIEWS.

How to Counsel Students : By E. G. WILLIAMSON. (London : McGraw-Hill Publishing Co., Ltd., 1939, pp. xx+562. 21s. net.)

This book marks an interesting stage in the development of the American educational system. It has been found that the combination of intellectualism and mass methods of teaching have resulted in a style of education quite unsuited to many, if not the majority of, school and university students. Thus at some universities as many as 50 per cent of the entrants fail to graduate, while even those who succeed often find the knowledge they have acquired of little use to them in their subsequent careers. In spite of certain outstanding reform movements, it does not seem possible at present to introduce on a wide scale teaching methods which are adapted to the needs of individual students; and 'student personnel work' has been developed to remedy this lack. The 'counsellor' or 'student personnel worker' is a combination of careers master, director of studies and college tutor, who is appointed to give educational and vocational guidance to individual students, and to advise them in any more general problems which arise in the course of their high school or university careers.

Professor Williamson is to be congratulated upon his enthusiasm in demonstrating the value of this work, and upon his method of approach to it. Thus he emphasizes the use of all the relevant test methods—intelligence and aptitude tests, interest and personality inventories—in assessing the students' capabilities and relating them to educational and vocational opportunities. But at the same time he recognizes that these data must be combined with information obtained by clinical methods to give reliable diagnoses of the students' problems, and to indicate the ways in which these problems may be solved.

But Professor Williamson cannot be altogether commended upon the manner in which he describes the performance of this work. He groups the problems and difficulties with which he is faced according to their superficial and overt symptoms (personality, educational, occupational, financial and health problems), attempting little analysis of their fundamental causes. For instance, separate chapters are devoted to Uncertain Vocational Choice, Unwise Vocational Choice and No Vocational Choice. But he himself states that "the reader should conclude that the same causes operating in different students may produce an uncertain, an unwise or no choice at all." The reader is thus presented with a series of disconnected and repetitive descriptive statements, unrelated in any general scheme or classification based upon underlying psychological causes, and in consequence very hard to grasp or to remember. Moreover, the actual problems could be better understood and elucidated by anyone who took into consideration the much valuable work which has been devoted to these underlying psychological causes. Thus the author states that little is known about the lack of motivation as a cause of scholastic failure, while ignoring the work on unconscious motivation described, for instance, in several able American books on adolescent psychology. And no non-American work on these or any other problems is mentioned. Again the treatment of emotional difficulties is superficial to a degree; one cannot believe that problems resulting from sexual difficulties are so infrequent among American students as to be not worth mentioning.

We hope that Professor Williamson will develop his interesting methods of counselling in the light of recent psychological and psychiatric work, and will then describe them to us rather differently.

M.D.V.

Christianity and the New Psychology : By W. B. SELBIE. (The Centenary Press, pp. 173. 7s. 6d.)

Those familiar with Dr. Selbie's work as theologian and as author of "The Psychology of Religion" would be pre-supposed to welcome his views on the later developments of the new science and its attitude towards the Christian religion. They would fear no recurrence of the early supposed antagonism between the two. Nor is there in Dr. Selbie's treatment any trace of denunciation or of any tendency to deny to psychology its legitimate sphere of research. On the contrary he freely

admits that "as a method of diagnosis *psycho-analysis* is invaluable." Dr. Selbie is inclined to make the term "New Psychology" connote merely psycho-analysis and behaviourism. His criticism of both, though acute, must not be understood as applicable to the more carefully explored fields of psychological research, productive of such assured results and full of promise for greater in the future. Even the followers of Freud and Jung are guilty at times of speaking of the New Psychology as if they were its controllers and in sole possession of its territory. Dr. Selbie, so far from over-stating the case of default as regards religion, might even have uttered a caveat in the name of exact-science. But the important point to be borne in mind is that when dealing with New Psychology and its representatives he is concerned with psycho-analysts in particular, and especially with their uncompromising attitude towards religion. His judgments regarding them would be inapplicable to the workers in the wider field. Wherein then is the difference between the positions adopted by Freud and Jung and their followers and that which the Christian interpreter claims as more satisfying for man's needs?

To answer that question is to indicate the value of Dr. Selbie's survey. This latter is two-fold in character: in the first place, it differentiates between the actual accomplishments of the New Psychologists and the unwarranted conclusion drawn therefrom concerning the nature of religion. To declare that the whole of religion is an illusion and that the Christian idea of God, like all others, is just a projection on the void of men's desires and fears is to provoke the reply: "This is rather like old dogmas newly adopted, but is certainly not sound deduction." It takes no account of man's spiritual striving in history or in living experiences. It is because Christianity notes and seeks to satisfy the soul's aspiration that it transcends all merely materialistic aids. Where knowledge halts faith goes forward.

The second and more positive part of Dr. Selbie's rejoinder comprise Chapters IV-X of the book. There, in wholly admirable manner, he deals with fundamental Christian ideas and is more concerned to explain their underlying significance in human need than to contend for any finality of form. The treatment of such topics as Man and Sin, Confession and Forgiveness, is inevitably suggestive rather than exhaustive, nevertheless the cumulative evidence of the second half of the book tells decisively in favour of Dr. Selbie's conviction, shared with Dr. William Brown and Dr. Hadfield, that religion is "the best and surest means of perfecting the good work begun by psycho-analysis" (p. 140). We have nothing but praise for an admirable piece of work, and not least its excellent controversial tone.

H.J.R.

Technique of Analytical Psycho-Therapy: by WILHELM STEKEL. (The Bodley Head, London, pp. xvii+408. 21s. net.)

Dr. Stekel has had some thirty years' experience as an analyst, and in this book he gives us the results of reflections upon his own method. To those familiar with the orthodox doctrines of psycho-analysis much of this book will not be new; but a good deal will not only be new to some, but unacceptable to the majority of Freudians. It is pleasant, however, to take up a book which approaches the problem from such an independent point of view, and discusses so many of the difficulties in an acute and interesting manner. The main clue to Stekel's own position is given by one or two sentences on page 66: "The use of intuition is the most significant distinction between our analysis and that of the classical practitioners of the Freudian School ('orthodox' analysis, as it is called). Our basic principle is that the patient hides the core of his malady, being unable or unwilling to recognize the existence of the complex from which he suffers. If unable, he is genuinely soul-blind, is scotomized; but whether he is 'unable' or 'unwilling' is of exclusively theoretical moment."

Dr. Stekel gives accounts of many individual patients, discussing the particular modes of treatment he has found suitable in various cases. He makes some useful contributions to the doctrine of transference and its value and dangers. He holds that Freudian psycho-analysis pays excessive attention to early childhood, ignoring the actual present conflict. In particular, he criticises the idea that psycho-analytical treatment is necessary over a long period, and maintains that in many instances patients can be cured in relatively few visits.

Altogether enough has been said to show that Stekel brings a certain freshness and individuality to this subject, but there is a great deal of unnecessary repetition and verbosity. There is also a serious loss in that there is no index, and the general arrangement might be better.

C.W.V.

The Education of Backward Children: by M. E. HILL. (Harrap and Co., pp. 174. 5s.)

This book is an account of three years' experimentation with classes for backward children in the schools of Southend.

The direction of these classes was the concern of Miss Hill, who, with help from the teachers of the classes, has produced a most practical book. Miss Hill discusses the psychological basis for special class work and the relationship that should exist between diagnosis and method. A simple testing programme is outlined and a record card described. The book is weak on the diagnostic side; fuller indications of this aspect in reading and number might have been given. Miss Hill deserves to be congratulated for the excellent lead she has given teachers in making use of attainment test results as indicating levels from which work in reading and number might profitably start. Suggestions along these lines are exceedingly good.

F.J.S.

Knowledge and Character: By J. C. MAXWELL GARNETT. (Cambridge University Press, pp. xii+358. 18s. net.)

In the year 1921 Dr. J. C. Maxwell Garnett wrote that monumental book *Education and World Citizenship*. In that book he was concerned in the main with his conception of the aim of education. In the present volume he tries to say "more simply and more shortly" what that aim should be. The author finds that some of his earlier suggestions have received support in educational advances in the ensuing period, e.g., in the Hadow and Spens Reports. But, although the author has made use of some of the results of experimental psychology of the last twenty years, the main lines of argument and the conclusions remain the same. Many of the criticisms advanced at the time of the appearance of the earlier volume (e.g., see *Journal of Experimental Pedagogy*, Vol. 6, No. 4, March, 1922, pp. 254-256) also remain.

General Psychology: By J. P. GUILFORD. (London, Chapman and Hall, pp. xii+630. 18s. net.)

The author of this volume has dealt with his subject under six main divisions: Introduction, Sensory Activities, Motivation of Behaviour, Acquiring New Adjustments, Symbolic Activity, and Individual Differences. He thus reverts to an older arrangement. He has been led to this decision by his experience with students and by his desire to satisfy the needs of those taking an introductory course in psychology. To this end he has introduced many applications of the subject to everyday life and its activities, has made his presentation scientific, has been eclectic in his selection, and has eschewed controversial issues and theories. The book is likely to be quite useful for students requiring a reliable introduction. It is extremely well produced.

Public Opinion: By WILLIAM ALBIG. (McGraw-Hill Publishing Co., pp. xi+486. 24s.)

Professor Albigh has chosen a topic of great interest at the present moment, and one which needed the comprehensive treatment which he has given here. Almost every aspect of the subject is treated, including chapters on "Psychological Processes and Opinion," "The Leader," "Legends and Myths," "The Measurement of Opinion," "Propaganda" and "The Art of Propaganda," "The Radio," "The Press," "The Motion Pictures." Undoubtedly students of this topic will find a large amount of material of value; and in addition there is a most extensive series of further references, which themselves cover thirty pages.

Biographies of Child Development: Part I by ARNOLD GESELL; Part II by C. S. AMATRUDA, B. M. CASTNER, and HELEN THOMPSON. (Hamish Hamilton Medical Books, London, pp. 328. 15s.)

This is a record from the Clinic of Child Development of Yale University, giving an account in detail of the mental development of eighty-four infants. Part I records the further development of infants on whom reports were given first in a previous volume, "*Infancy and Human Growth*" (1928). This covers thirty cases. Part II gives detailed records of some fifty other children.

In Part I we have records covering periods for the same child as long as from three or four months to ten or twelve years, or from one or two years to seventeen years.

Dr. Gesell points out that the basis of selection has been the instructiveness of the record. There has been no attempt to illustrate the reliability of earlier tests. Indeed, the method of selection "tends to exaggerate the frequency of cases of irregular or a-typical development" (p. 5). Dr. Gesell still claims that the concept of "constancy of development rate" is a serviceable one, though he never identified his development quotient with intelligence quotient; this no doubt is in reply to several investigators who have found a low correlation between his tests at six months or so and intelligence tests at three or four years. It should be clearly realized, then, that the present book is primarily a study of rather exceptional types of development, illustrating irregularities in development. "Ten years of experience," writes Dr. Gesell, "with improved methods, have sharpened our caution, but have not dulled our faith in the possibilities of clinical prediction." Indeed, he believes not only in the predictability of development of intelligence or motor adaptation, but in that of temperamental traits, when we have discovered the requisite facts and technique (p. 105).

Furthermore, although these cases are, in a sense, a-typical, Dr. Gesell stresses the fact that they themselves follow a regular genetic pattern. You have, for example, the Mongol, who reveals disabilities at six months and then proceeds to develop in accordance with a regular sequence characteristic of that particular type.

This section of the book is completed by a chapter of a more theoretical type on growth characteristics. This is short but very valuable, cautious yet highly suggestive. The most interesting idea is that of the "intrinsic insurance factors"; which enable the organism to compensate to some extent for certain defects and, into the places of missing elements, to push other elements as it were to fill up the gap, in a way comparable to what is found in "surgical excisions, transplantation and other interferences with the growing tissues of laboratory embryos" (p. 106).

Part II gives further studies of individual children, various types being grouped appropriately, e.g., those of superior mental endowment; language problems; reading disabilities; irregularities in early mental development; immaturity and prematurity, etc. Some of these cases are followed from a few months to several years, some from a year or two to later years. One interesting generalization is the steadiness of the temperamental traits revealed by five selected children, assessed at one year and again at five years.

The volume is a further example of the valuable work which is being carried out under the guidance of Dr. Gesell in the collection of facts of infant development.
C.W.V.

The Nature of Mathematical Thinking: by F. W. MITCHELL. (Melbourne University Press in association with Humphrey Milford of the Oxford University Press, pp. 130. 7s. net.)

The first half of this book is devoted to a review of previous investigations and theoretical enquiries into the nature of mathematical thinking. The remainder deals with an investigation which aims at validating the findings outlined previously. A great handicap was the lack of reliable diagnostic tests which could determine and evaluate pure type operations. Nineteen tests, selected mainly from those compiled by previous investigators, were applied to 195 secondary school boys and girls of average age fourteen years one month, and a search was made for specific

factors of importance. The results confirm the view that mathematical ability cannot be regarded as a single or unitary trait and that it includes certain group factors in addition to a central common feature. A group factor of fundamental importance seems to be "the capacity to hold in mind a complexity of ideas with a full awareness of the inter-relationships of their several parts, to analyse them, and to abstract from them a schema or system available for use in a new situation."

The author stresses the need for a better understanding among teachers of the mental processes fundamental to mathematics. Any mathematical specialist who is keen on carrying out research work would do well to read this book in order to become acquainted with the findings of previous investigators and to become familiar with many problems which are yet unsolved. Further research on the lines indicated would tend for more effective mathematical thinking and not merely "computational effectiveness."

W.S.F.

Secondary Education and Life: The Inglis Lecture, 1939, by CHARLES A. PROSSER. (Humphrey Milford, pp. 91. 4s. 6d.)

The author has not only put forward a strong challenge to secondary schools to enter upon sweeping and much-needed reforms in their curriculum, but has subjected their present methods to a most valuable criticism, destructive and constructive. The reforms suggested are two kinds: first, a widening of the syllabus to include training material for as many special abilities as possible; second, a rearrangement of content to increase the number of elements common to school and life situations so that "transfer" of method, technique, and response may be facilitated.

The criticisms first deal ruthlessly with those subjects retained for traditional or "faculty training" reasons and which seem to have no direct "use value" for life. To rebuild the curriculum a three-point test is suggested, that all subjects must pass to justify their inclusion and an example of a detailed "step down" analysis of the content of a subject in its relation to the needs of life forms a very valuable contribution for the teacher who is engaged in framing or revising courses of study.

In spite of these undoubted values, the reader is left with a sense of disappointment that the opening question, "What should the secondary school teach in order to prepare youth for the better performance of the job called life?" has been answered as though education is merely concerned with the better performance of the job called earning a living.

K.D.H.

Speech Development of a Bilingual Child, Vol. I: By WERNER F. LEOPOLD. (North-western University, 1939, pp. 188, \$2.25.)

It is difficult to imagine the ideal title for this book; the one given is rather misleading. This is not a study of bilingualism proper, and the form of bilingualism dealt with is, as the author himself points out, of secondary importance. One feels that it should be read primarily as a record of linguistic development, not merely for the results obtained but rather for the method of working. It might be said against the book that much will be lost if the reader is not familiar with colloquial German of the nursery type, the multitude of technical terms used in modern linguistics, and phonetic symbols, not in their simplest, but in their most advanced application. To this the reply would be that a thorough study of early linguistic development is impossible without an understanding of such terms and of phonetic script. Hitherto the linguist has been far behind the psychologist in such studies, yet it is precisely the linguist's contribution which, by the very nature of its approach, should be the more important. The work here reviewed is sure to be regarded as invaluable.

A word of praise is also due to the printers who have surmounted unusual obstacles, and to the proof-readers, who must have spent long hours over an exacting task.

A.T.

Technical and Vocational Education and Apprenticeship. Report presented by the International Labour Office to the 25th session of the International Labour Conference.

This report was prepared by the International Labour Office from replies received to a questionnaire sent to the countries participating in the work of the I.L.O. The questionnaire asked for information on such points as the age at which vocational education should be started and the extent to which it should be included in the general school curriculum; the question of full-time vocational education prior to entering employment, as compared with part-time vocational education during employment; the desirability of establishing a net-work of vocational and technical schools adjusted to the economic requirements of regions and localities; the possibility of establishing special courses for journeymen, technical staff, and even managerial staff; the place of general subjects in a vocational curriculum; the function of regional committees in co-ordinating the work of educational institutions with the needs of industry; the encouragement of apprenticeship and the possibility of enforcing apprenticeship regulations by Government action; the recruitment and training of teachers for technical and vocational courses. The publication is a useful one, containing as it does in concise form much information on vocational and technical education in many different countries.

D.S.A.

The Morgan Intelligence Quotient Calculator. (Robert Gibson and Sons, Glasgow, 4s. complete with leather pocket.)

This is an ingenious device, very suggestive in its method of the sliding rule. It consists of a bakelite disc, on which mental ages are marked, including divisions for each month. On this revolves a smaller disc on which chronological ages are marked (also with month divisions). One only has to revolve the inner disc until the chronological age (say 9½) is opposite the mental age (say 10½) to find displayed in a special opening the correct intelligence quotient, viz., between 113 and 114. The age limits are 8 and 14; thus the highest intelligence quotient that can be given on this disc is 125, and the lowest 66. It should be most serviceable for those who need to calculate quickly a fairly large number of intelligence quotients, and also for checking the accuracy of calculations made by students in the course of their training. The device can also be used for the achievement quotient.

The inventor is to be congratulated and so is the publisher on producing it in such a convenient and attractive form.

Children in Flight: by A. H. BODY. (University of London Press, pp. 95. 2s. 6d. net.)

This little book tells in interesting form the story of the first three months of evacuation. It is recommended to those who have formed hasty conclusions based upon newspaper letters written by disgruntled parents both in evacuation areas and in reception areas. One is led to realize the enormous organization required beforehand and the many difficulties that had to be overcome in the reception areas. Humorous incidents showing the reaction of the children to their new environment are recorded and there are some excellent photographic illustrations. The book serves as a pleasant introduction to a much-discussed subject.

W.S.F.

The Five Sisters: by W. E. BLATZ. (Dent, London, pp. 194. 10s. 6d net.)

This may be regarded as a popular edition of "The Collected Studies of the Dionne Quintuplets," by Dr. Blatz and others, previously reviewed in this journal; but being written entirely by Dr. Blatz himself, it is much more of a unity. It is suitable chiefly for the general reader or parent. The psychologist who has access to the earlier volume will find little of importance that is now reported for the first time. The book is admirably produced, with over fifty interesting photographs.

La Psychologie Animale : by P. GUILLIAUME. (Collection Armand Colin, pp. 210.)

This is a most excellent text-book. In brief, the chapters deal with the notion of animal psychology ; the methods of animal psychology ; application of the methods ; problems of instinct ; problems of intelligence ; finishing with a section on men and animals.

In his preface the author remarks that it is impossible in so short a volume to give a full account of so large a field of psychology. He nevertheless succeeds in compressing an enormous amount of it within his pages, illustrating with pictures and diagrams—there being twenty-six figures all told. The material is well chosen, and presented with scholarly ease. S.J.F.P.

OTHER PUBLICATIONS RECEIVED.

Social Case Recording : by Gordon Hamilton, pp. 219. 12s. 6d. (New York School of Social Work, Columbian University Press.)

This is a new edition (with very slight alteration) of a book already reviewed in this journal.

Voleurs d'enfants : by J. L. Bédé and R. J. F. Cook, pp. 81. 1s. 6d. (Macmillan and Co., Ltd.)

The Second Kipling Reader (selected stories and poems), pp. 212. 2s. 6d. (Macmillan and Co., Ltd.)

A Stage "A" Geometry : by L. R. Spensley and E. N. Lawrence, pp. 102. 2s. (Macmillan and Co., Ltd.)

Casas Civil War in Spain : edited by H. E. Gould and J. L. Whiteley, pp. 140. 2s. (Macmillan and Co., Ltd.)

Unwritten History and How to Read It : by W. P. Westell and K. Harvey, pp. 200. 2s. 6d. (Macmillan and Co., Ltd.)

Model Essays for School Certificate and Matriculation : by T. S. Jones, pp. 193. 2s. 6d. (Macmillan and Co., Ltd.)

Reading and Composition, Book 1, by R. Macintyre, pp. 135. 1s. 9d. (Macmillan and Co., Ltd.)

RESULTS OF A SURVEY OF SENIOR SCHOOL
EVACUEES.

BY M. A. DAVIDSON AND I. M. SLADE.

(From the Psychological Laboratory of University College, London).

- I.—*Aims, scope and methods of the inquiry.*
II.—(a) *General nature of the evacuation scheme.*
(b) *Factors contributing to successful and unsuccessful billeting.*
III.—(a) *Fluctuations in number of evacuated children.*
(b) *Assessment of relations between children and foster parents.*
(c) *Satisfactory and unsatisfactory adjustment of children and its relation to (1) sex, (2) age, (3) change of billets, (4) parents' visits, (5) presence of other children in the foster home, (6) size and financial status of the child's family, (7) the child's intelligence.*
(d) *Neurotic symptoms in the group examined.*
IV.—*Summary and conclusions.*
V.—*Appendix on statistical methods.*

I.—AIMS, SCOPE AND METHODS OF THE INQUIRY.

The following paper summarizes the results of an intensive study of a hundred evacuated school children. The methods followed are roughly those evolved by Burt for the clinical study of 'problem children' during his work for the London County Council. In September, 1939, when the evacuation of school children took place, it was suggested that a co-ordinated investigation into the problem might be attempted in different parts of the country by teachers and others, who had been former students of psychology either at University College or at the London Day Training College. A preliminary questionnaire was drawn up; and a first general survey of the results was eventually published by him in an earlier issue of this JOURNAL (X, 1940, pp. 13 et seq.). After the Department of Psychology had moved from London to Wales, a more intensive and prolonged investigation became possible. Nearly a thousand boys and girls from a large city on the north-west coast had been sent to a small seaside town in Wales; and an investigation of the effects of evacuation on a sample group of these children was started in November and continued into the summer of the following year.

As there were only two field-workers, it was not practicable to examine all the children and billets. The inquiry was consequently

limited to children attending the senior department of the largest and most representative of the three evacuated schools. The pupils of the school selected were drawn from a lower middle and working class area of their native city. The group finally examined comprised 100 children—56 boys and 44 girls, aged 11–14 years.

We are indebted to many persons for their interest and assistance—to Professor Burt for suggesting the problem, together with the general method of approach, and for putting us in touch with other investigators; to Miss Simmins and other members of the Department for further help in planning and carrying out the investigation; and to the Directors of Education in both the evacuation and the reception area for permission to carry out the research.

We have also to express our grateful thanks to the Billeting Officer, to the foster-parents, and above all to the head and assistant teachers of the senior school for their ready co-operation; since this paper was prepared, a similar analysis has been published based on a survey carried out in Cambridge; and we are especially indebted to Dr. Susan Isaacs and Miss Clement Brown for fuller information about their methods and results.

Our general scheme covered the relevant points enumerated in Burt's *Record-Form for Problem Children*, where they are set out under four main headings: (1) Family History, (2) Home Conditions, (3) Physical Condition, (4) Mental Condition, (a) Intellectual Characteristics, including a test or assessment of intelligence, etc., and (b) Temperament and Character, including a special note of neurotic symptoms and delinquencies.¹ Neither children nor teachers were given any set questionnaire to be filled up in writing.

The investigation was carried out in two main stages: (1) First, an attempt was made to get a general idea of the functioning of the evacuation scheme in this area and of the factors contributing to satisfactory billeting. The results of this general survey, and a brief review of the factors which appear to favour or retard successful adaptation of the children to their new surroundings, will be given in Section II.

¹ A fairly detailed version is printed as Appendix I to *The Backward Child* (University of London Press, 1937). We should also mention the full and suggestive scheme drawn up by Prof. Valentine, to whom we are especially grateful for permission to study a copy in advance (the questionnaire has since been published in this *Journal*, X, pp. 35–48). As the authors both point out, their more elaborate record-forms cover details that are not necessarily relevant to every problem. To complete them in their entirety would have been unnecessary for our purpose. On the other hand, the first roneo'd questionnaire drawn up in the Department for the initial general survey was a little too brief for a prolonged intensive inquiry. To a large extent, therefore, we have evolved our own plan of work; but it seems fairly comparable with that followed by other investigators of the evacuation problem.

(2) Secondly, the 100 children were examined individually in an attempt to discover how far the evacuation scheme had been a success or failure in each case. This more intensive inquiry was conducted as follows :

A.—Each child was interviewed by an investigator and an attempt made to discover his or her attitude on the following points :

- (i) leaving home, parents and friends ;
- (ii) foster parents and billet ;
- (iii) old and new towns.

At the outset it was made clear to the children that the investigator was a Londoner and had no connection with either town. Consequently they were able to express their candid opinions of their present environment.

B.—A systematic record was made of each child's age, parents' social and economic status, number of brothers and sisters, whether at home or evacuated, number of other children and adults in billet, number of family visits, changes of billet and any special points of interest. Part of this information was obtained from the teachers and part from the children or their parents.

C.—All the children who were still in the reception area in May were interviewed a second time. Their general condition, and any changes in their attitude on the points mentioned under A, were noted.

D.—The majority of the children were given Burt's revision of the Revised Stanford Binet Scale, 1937. During the interview and the testing particular note was made of the child's attitude and behaviour, e.g., a note was made of the child's apparent happiness, timidity, good or bad temper, social co-operativeness, excitability, fatigue, anxiety, and the usual temperamental and nervous symptoms.

E.—The billet of each child was visited, and the situation discussed with the foster parents and where possible with other members of the household. The visits were made when the children were away from the billets ; and both investigators were present on all occasions. Information was obtained on the following points :

- (1) The general attitude of the foster parents towards the evacuees, e.g., whether they had come to regard them as members of the family or not, whether they would be pleased to keep them during the war or found them a burden.
- (2) The economic and cultural status of the foster-home and the effect of the presence of the evacuees on the material circumstances of the foster parents ; e.g., whether they found the billeting allowances adequate, whether they found the extra work burdensome, especially in households with a number of children, whether they had any difficulties in obtaining clothes for the children, etc.
- (3) The general behaviour of the evacuees, the foster-parents' impressions as to the intellectual, temperamental and moral characteristics of the children, more particularly with reference to sleep, appetite, table manners, language, general cleanliness, indoor amusements and occupations, social relations with other children and persons in the household, whether cheerful or morose, aggressive or inhibited,

excitable or phlegmatic, truthful, obedient, polite, helpful, quiet or rowdy, and various special difficulties (bed-wetting, vermin, excessive crying, home-sickness, late hours, noise, quarrelling, theft, cruelty or destructiveness, etc.).

- (4) The parents' attitude to the foster parents in cases where they had visited the foster home, e.g., whether grateful or rude and unhelpful.

F.—Each child was discussed with two or more teachers. In this way we were able to check our impressions and reports on the child's physical, intellectual, and temperamental characteristics, and to note differences in the child's attitude and behaviour at school and at his billet. The teachers were asked whether they considered that the child had been billeted successfully and whether any marked physical or mental changes had taken place in the child since leaving his own home. As the teachers had known the homes from which the children came, had helped to billet them, visited the billets regularly and were called in by the foster parents in all cases of difficulty, their information was most valuable.

From these various reports and impressions an attempt was then made to determine (a) which children had successfully adapted themselves to their new conditions, i.e., whose relations with their foster parents were satisfactory and who were as happy as could be expected, (b) which had done so with moderate success, and (c) which had failed to do so altogether. The numbers in each group are given and analysed in Section III,¹ and the conclusions are compared with the corresponding results obtained in the recent survey at Cambridge.²

II.—(a) GENERAL NATURE OF THE EVACUATION SCHEME.

In general, material circumstances in the billets were entirely satisfactory; indeed, in the majority, the standard of living was higher than that to which the children had been accustomed. The children's health was safeguarded by co-operation between school, billet, and an efficient medical clinic. Many children had arrived with insufficient clothes, and requests to the parents often failed to produce them.³

¹ Prof. Burt has pointed out that, as in the London cases studied by him in the last war, the symptoms of increased neurosis and delinquency reported among evacuated children *may also be observed among non-evacuated children* living under war-time conditions. Thus, the increases in theft, mischievous adventures, anxiety-states and the like, observable among evacuees are not to be attributed too hastily to the mere fact of evacuation. Another student of the Department has been carrying out an inquiry among non-evacuated children in the same city as that from which our own evacuees were drawn. But so far it has not been possible to obtain such full data for a control group of non-evacuated children, though it is hoped to publish a comparative study later.

² STRAKER AND THOULESS, "Preliminary Results of the Cambridge Survey of Evacuated Children," this *Journal*, X, ii, pp. 97-113.

³ Mrs. Anthony, a research student, of University College, London, who has been investigating evacuation problems in an area in the West Riding, found that the need for clothes was a source of considerable friction between the foster home and original home in many cases.

Charitable organizations supplied the poorest children, but sometimes only after long delay. Many foster parents were kind enough to spend their own money on supplying necessary garments or gave up time to making them, though of course they were under no obligation to do so.

The social facilities afforded by the billets varied much more widely than the material circumstances. In the most satisfactory cases the children joined in all the amusements of the foster family. In other cases the newcomers had to amuse themselves; and in some households they were expected to spend all their leisure time outside the billet and only come in to meals and to sleep.

In most foster homes a reasonable standard of discipline was maintained. The teachers were called in to deal with special difficulties.¹ Where the foster parents co-operated with the teachers and reported misbehaviour (e.g., late hours) trouble was usually averted.

But slight provision was made for organized leisure activities. Apart from the Girl Guides and the schools, the churches and chapels alone provided recreation (chiefly in the form of sewing clubs, choirs, and the like). The girls seemed content to spend their evenings reading, knitting or doing housework; but many of the boys found time hanging heavily on their hands and devoted their ingenuity to opening slot machines and other mischievous adventures. The problem became less acute in summer, when both the boys and girls were able to bathe and play on the beach and go for long walks.²

The problem of schooling was solved by having the children in school for three hours a day; halls were provided in which recreational activities could be carried on for another $1\frac{1}{2}$ hours. The evacuees occupied the school buildings for their three-hour session mornings and afternoons in alternate weeks. The $1\frac{1}{2}$ hours of organized recreation was chiefly devoted to physical training, community singing and educational pictures supplied by the city; there was country dancing, conducted by the students of a physical training college, for the girls, and football, woodwork and gardening for the boys. The boys turned a piece of stony and unpromising land into a vegetable garden which is already beginning to supply the foster parents with fresh vegetables. The children enjoyed these periods; and their physique greatly improved.

¹ All the visiting had to be done by the teachers, who had no help from any social workers or voluntary helpers.

² The Board of Education realized that there would be need for organized out-of-school activities for the evacuees, and a circular published before the war adequately summarizes the situation and makes excellent suggestions for occupying leisure time. (Board of Education, "Schooling in an Emergency," Circular 1474, pp. 19-20. H.M.S.O.)

A number of parents kept in touch with their children by writing regularly, by sending pocket money, parcels of clothes and sweets, and, when they could afford it, by visiting them. A few parents, however, neither wrote to nor visited their children, who consequently felt neglected. The visits of the parents produced effects both good and bad. Contented children were often taken home because their parents missed them or did not like the billets or could not supply them with clothes, or merely because there had been no air raids.¹

In other cases the foster parents were upset because the visitors were rude and seemed ungrateful for all that they had done for the children: several parents accepted free meals from the foster parents and then left without a word of thanks. However, the children's joy at seeing their parents more than counterbalanced those disadvantages, and their contact with their parents was maintained. Often too, friendly relations between parents and foster-parents were established; and that proved a real advantage. Several investigators have concluded that on the whole "visits of parents to children at regular monthly intervals are desirable"; and the observations made during this survey bear this out.²

One point calls for special emphasis and attention from the psychologist, namely, the treatment of difficult children. The Ministry of Health,³ Professor Burt⁴ and the Cambridge Committee have all advocated the establishment of a hostel or camp for the accommodation of children unsuitable for billeting in private homes and the need for such a hostel has been emphasized here. In the area with which we are concerned the lack of such any provision for dealing with difficult children resulted in homesick and nervous children, persistent bed-wetters, delinquents and badly behaved children all being sent home.

II.—(b) FACTORS CONTRIBUTING TO SUCCESSFUL AND UNSUCCESSFUL BILLETING.

The following descriptions will serve to indicate the characteristics of good billets of different types:

(1) The household consists of a middle-aged motherly woman and her husband and a young lodger. It is a fairly comfortable working class home. The foster family consists of four siblings, girls aged 11 and 6, and boys, aged

¹ The reasons for mothers removing their children given in the *Liverpool Preliminary Report on the Problems of Evacuation* (University Press of Liverpool, 1939) are similar to the ones found here, except that in this area no children returned home because accommodation could not be found for them.

² S. L. YATES, "Visiting," *New Era* (1940), XXI, iii.

³ Ministry of Health, "Government Evacuation Scheme." Memo. 8. Enclosure to Circular 1968, pp. 17-18. H.M.S.O.

⁴ CYRIL BURT (1940), "Neurotic Symptoms among Evacuated Children." *This Journal*, X, i, p. 13.

13 and 8 years. All the children are of superior intelligence, their manners are good and they have given very little trouble. The only complaint the foster mother has is that they are a little noisy. They have plenty of toys and games and a room to play in and the foster parents played games with them in the long winter evenings.

Their parents write to the children and visit them regularly and have established friendly relations with the foster parents on these visits. They supply as much clothing as they can afford; and the foster mother has helped by making clothes for the children, cutting up clothes of her own to do so. All the children are well and happy; and, although very attached to their parents, are pleased to remain in the home into which they have been successfully absorbed.

In this billet all the circumstances were favourable to the successful adaptation of the children. The minimum change in their environment had taken place. The social and economic status of the new home was not very different from the old, the children were kept together, and the foster-mother resembled their own mother in nature and even in appearance.

(2) The billet now to be described is one in which difficulties of various kinds have arisen and have all been overcome. The family consists of a husband, wife and grown-up daughter. The children received include two sisters aged 13 years and 10 years (the older girl is a bed-wetter, but has greatly improved under sensible treatment), and two boys of 12 from different families: one is a stutterer and so bad tempered that his own brother refuses to stay in the same billet; both teachers and companions find him difficult to manage; the other is dull, and was led into delinquency by companions outside the billet. All the children are well fed and well looked after. The foster parents and their daughter have established friendly relations with all the children—even with the bad-tempered lad who had to be shifted from other billets, but is now improving under their care. The children are happy and do their tasks about the house willingly: the younger girl helps to tend the foster father, who is ill, and he calls her his “little nurse.” The small delinquent was gladly accepted back into the home after he had been before the court. The foster parents would be most unwilling to part with the evacuees, and the children declare they would rather return home than be transferred to any other billet.

In the moderately good billets, while general conditions are fairly satisfactory, there is often some single factor sufficient to upset the whole situation. The commonest were: (1) Wide difference in the social and economic status of the homes and foster homes;¹ (2) clothing difficulties; (3) discipline in the billet being too harsh or too slack and resulting in the children getting into trouble outside the billet; (4) wide difference in intelligence between children and foster parents; (5) refusal to allow children to spend leisure time in the billet or to permit a normal amount of rowdiness; (6) refusal to receive visiting parents.

There were few really bad billets. The chief factors rendering them unsatisfactory were the following: (1) failure to give the children sufficient food; (2) drink causing one of the foster parents to be brutal towards the

¹ Confirming the findings of Miss M. D. Vernon. This *Journal*, X, ii, p. 133.

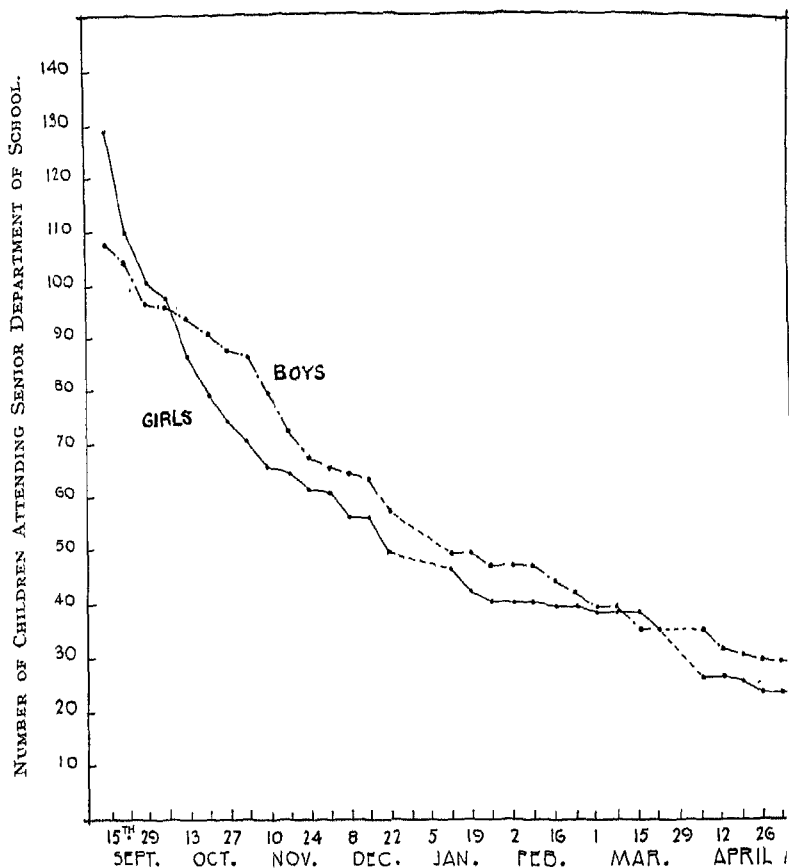
children ; (3) too much housework to be done, especially by the girls ; (4) continual nagging of the children and unkind references to their families and homes.

III.—(a) FLUCTUATIONS IN NUMBER OF EVACUATED CHILDREN.

The graph below gives the number of boys and girls in attendance at the school each week from September 15th to May 3rd. As can be seen the numbers fell rapidly until December, the rate of return being greater in the case of the girls than in the case of the boys. After the

FIG. 1.—DECLINE IN NUMBERS OF EVACUATED SCHOOL CHILDREN.

Graphs showing school attendances of evacuated boys and girls still remaining in reception area : based on school attendances at weekly intervals, from September, 1939, to May, 1940.



beginning of December the number of weekly returns decreased steadily; but sharp falls occurred as a result of the December and Easter holidays. By the beginning of April the returns had almost ceased.

III.—(b) ASSESSMENT OF RELATIONS BETWEEN CHILDREN AND FOSTER PARENTS.

The sample of 100 children aged 11–14 years was divided into three groups on the basis of the satisfactoriness of the children's adjustment to their new homes and their relationship with their foster parents. A plus rating (+) was given to those children who appeared reasonably happy and whose foster parents were pleased or at least willing to continue to keep them: a zero rating (0) was given to those doubtful cases whose adjustment was neither wholly satisfactory nor unsatisfactory; children who had failed to establish friendly relations with their foster parents and to settle down in their homes were rated minus (-).¹

Of the 100 cases 70 were rated + (satisfactory), 13 were rated 0, and only 17 were rated - (unsatisfactory).² Had it been possible to begin the investigation earlier, it is probable that a slightly higher percentage of unsatisfactory cases would have been found, as there seems to have been a slightly higher proportion of the difficult children (about 25 per cent.) among those sent or fetched home in the first few weeks. In 7 out of the 17 unsuccessful cases the failure to adapt was due to qualities in the children themselves, e.g., delinquency, quarrelsomeness, cruelty, homesickness; these would have been unsatisfactory anywhere; in 7 cases the failure was due to the foster home being really bad, e.g., through failing to feed and attend to the children properly: 4 of these children later established satisfactory relationships in new billets; in the 3 remaining cases, external accidents conspired to make the children unhappy and disturb their relations with their foster parents; 11 of the children in the unsatisfactory group have since gone home, 2 have moved to more satisfactory billets, and the other 4 have had further moves and still not established satisfactory relations with any home.

¹ So far as possible classifications to those used by the Cambridge Survey have been adopted throughout this section for purposes of comparison. Owing to the small numbers examined, a 3-point scale has been used in place of the Cambridge 5-point scale.

² We should like to emphasize these figures. As Prof. Burt has already pointed out (*loc. cit.*, p. 10) an objective study of the evacuated children themselves provides (and alone can provide) a refutation of the exaggerated fears so widely expressed as to the presumable results of temporary evacuation. Even as we sent this to press, a long letter is published from a medical consultant declaring that the evacuation has been "one of the tragedies of war": "only when military necessity decides . . . is evacuation in any form advisable" (*New Statesman*, September 21, p. 283). Like so many others, the writer offers no empirical evidence whatever for the moral disasters she deduces.

The percentage of unsuccessful adaptations is double that found in Cambridge. The difference is statistically significant,¹ and may be due to the fact that the Cambridge Survey was begun a month or more later than this survey, when the most unsuccessful cases had presumably gone back home, or possibly to a slightly severer standard being adopted by the Cambridge investigators before any particular case was passed as a case of satisfactory adjustment.

III.—(c) SATISFACTORY AND UNSATISFACTORY ADJUSTMENT OF CHILDREN.

(1) *In relation to sex.*

Table I gives the number of boys and girls given the rating +, 0 and -

TABLE I.
SEX RELATIONS.

<i>Assessment.</i>	+	0	—	<i>Total.</i>	<i>Per cent.</i>
Boys	40	7	9	56	16
Girls	30	6	8	44	18
Totals	70	13	17	100	17

$$(\chi^2 = .14 \quad P = .71 \quad \phi = .04)^2$$

The percentage of unsatisfactory cases is slightly higher among girls; but this, it will be seen, may be due simply to chance. The correlation between sex and satisfactoriness of adaptation is negligible. We may therefore conclude that boys and girls appear to have adapted themselves almost equally well to their new surroundings.

This result is confirmed by the conclusion³ of the Cambridge workers that sex is not related to the satisfactoriness of adjustment of children.

(2) *In relation to age.*

Table II gives the number of 11, 12, and 13 year old children given the rating +, 0 and -.

¹ Percentage of unsuccessful adaptations :

Cambridge.	This Area.	Difference.
8.2	17.0	8.8
$\sigma \text{ diff.} = 2.73$	$\frac{\text{diff.}}{\sigma \text{ diff.}} = 3.23$	i.e. significant.

² A note on statistics used is given at the end of the article. In this and the following tables 'per cent' means percentages of cases rated minus, i.e., unsatisfactory.

³ This *Journal*, Vol. X, p. 99.

TABLE II.
SEX RELATIONS AND AGE.

<i>Assessment.</i>	+	0	—	<i>Total.</i>	<i>Per cent.</i>
(1) 11 years	14	4	6	24	25
(2) 12 years	24	4	3	31	10
(3) 13 years	32	5	8	45	16

$$(\chi^2=2.42 \quad P=.12 \quad \phi=.21)^1$$

$$(\chi^2=0.32 \quad P=.57 \quad \phi=.07)^2$$

There is no consistent evidence of the sharp rise in the number of failures towards 13 found in the Cambridge Survey. The differences between the age groups are not statistically significant; and, within the range 11-13 years, the correlation between age and satisfactoriness of adjustment is small.

(3) *In relation to frequency of change of billet.*

An attempt was next made to discover whether children who had had one or more changes of billet had adapted less well to the billet they were in at the time of the interview than children who had had no changes of billet. The numbers are given in Table III.

TABLE III.
CHANGES OF BILLET.

<i>Assessment.</i>	+	0	—	<i>Total.</i>	<i>Per cent.</i>
(1) No changes of billet.....	44	5	4	53	8
(2) One change.....	22	7	4	33	12
(3) More than one change....	4	1	9	14	64

$$(\chi^2=9.18 \quad P=.002 \quad \phi=.30)^3$$

The probability is only 2 in 1,000 that chance would account for the higher percentage of unsatisfactory adaptations among the children who have changes of billet. Changing of billets would therefore appear to be significantly related to maladjustment. The Cambridge workers,

¹ Comparing 11 and 12-year old children.

² Comparing 12 and 13-year old children.

³ Numbers in groups 2 and 3 pooled.

on the other hand, found no significant relation between changes of billets and satisfactory adjustment.¹

We ourselves, however, have observed that it is quite possible for children who have had a number of changes of billet finally to settle down; 4 of the children in the unsatisfactory group actually did so.

(4) *In relation to frequency of parents' visits.*

An attempt was next made to find out whether children who had visits from their parents tended to settle down better than the children who had no visits. Table IV contains the results of this analysis:

TABLE IV.
PARENTS' VISITS.

<i>Frequency of parents' visits.</i>	+	0	—	<i>Total.</i>	<i>Per cent.</i>
(1) No visits	11	2	4	17	24
(2) Some (1 or 2) visits	18	4	7	29	24
(3) 3 or more visits	41	7	6	54	11

$$(\chi^2=2.01 \quad P=.16 \quad \phi=.14)^2$$

The lower percentage of unsatisfactory adaptations among children who have frequent visits from their parents is not quite statistically significant, but the probability is only 16 in 100 that chance would account for this lower value. No final conclusions can be drawn from these facts, as the numbers in the groups are small; but certainly parents' visits do not seem to be necessarily unfavourable in their effects.

The Cambridge Survey yields much the same conclusion.

(5) *In relation to presence of other children in foster home.*

The children were classified into groups according to whether siblings, other evacuees or local children were present in their foster homes. The following tables give numbers in the various groups:

TABLE V (a).

<i>Assessment.</i>	+	0	—	<i>Total.</i>	<i>Per cent.</i>
Siblings in billet	32	9	9	50	18
No siblings in billet	38	4	8	50	16

$$(\chi^2=1.71 \quad P=.19 \quad \phi=.13)$$

¹ Cambridge did not separate 1 and more than 1 billet changes. In this area changes in the first fortnight have not been included as these were due to mere re-adjustment.

² Numbers in groups 1 and 2 pooled.

TABLE V (b).

<i>Assessment.</i>	+	0	—	<i>Total.</i>	<i>Per cent.</i>
Evacuees in billet	30	9	12	51	24
No evacuees in billet	40	4	5	49	10

$$(\chi^2=6.17 \quad P=.013 \quad \phi=.25)$$

TABLE V (c).

<i>Assessment.</i>	+	0	—	<i>Total.</i>	<i>Per cent.</i>
Local children in billet	19	3	4	26	15
No local children in billet	51	10	13	74	18

$$(\chi^2=0.09 \quad P=.76 \quad \phi=.03)$$

The presence of siblings and local children has no constant or significant relation to satisfactoriness of adjustment. In some cases the presence of siblings or local children led to quarrelling and exerted an adverse effect on the children's adjustment; in others the friendships established between local children and evacuees and the affection and care of siblings helped the children to settle down happily. The presence of other evacuees is perhaps related to poor adaptation to some slight extent.

The actual number of children, whether other evacuees, siblings or local children, present in the billet is shown in Table VI.

TABLE VI.

<i>Number of other children in billet.</i>	+	0	—	<i>Total.</i>	<i>Per cent.</i>
(1) 0	12	2	2	16	12.5
(2) 1 and 2	36	2	8	46	17.4
(3) 3 or more	22	9	7	38	18.5

$$(\chi^2=4.5 \quad P=.034 \quad \phi=.21)^1$$

The number of other children in the billet appears significantly related to satisfactoriness of adjustment. The probability that chance

¹ Numbers in Groups 1 and 2 pooled.

would account for the higher percentage of unsatisfactory adaptations among children billeted in large families is very small.

This conclusion, however, does not agree with the findings at Cambridge.¹

(6) *In relation to financial status of child's family.*

The number of successfully and unsuccessfully adapted children whose parents were in receipt of financial aid from organizations such as the P.A.C. and the U.A.B. and those whose parents did not receive such aid are shown in Table VII.

TABLE VII.

<i>Assessment.</i>	+	0	—	<i>Total.</i>	<i>Per cent.</i>
Parents on relief	37	6	9	51	18
Parents not on relief	36	7	6	47	13

$$(\chi^2 = .02 \quad P = .89 \quad \phi = .014)$$

There is no significant relationship between the children's adjustment to their new homes and the financial status of their parents. Children from the very poor homes do adapt quite as well as children from homes which are reasonably well-to-do.

(7) *In relation to child's intelligence.*

Seventy-three children had been given Burt's revision of the Revised Stanford-Binet Scale; and on the basis of the results of this test they were divided into superior (I.Q. 110), average (I.Q. 90-110) and dull (I.Q. 90-70) groups. The satisfactoriness of their relationship with their foster-parents was then compared with their intelligence.

TABLE VIII.

<i>Assessment.</i>	+	0	—	<i>Total.</i>	<i>Per cent.</i>
Superior	15	4	3	22	14
Average	21	6	11	38	30
Dull	8	2	3	13	25

$$(\chi^2 = .73 \quad P = .39 \quad \phi = .09)$$

¹ *Loc. cit.*, pp. 104-107.

There were too few children with I.Q.'s under 90 for them to be considered alone. The numbers from this group were, therefore, pooled with the numbers in the average group. The percentages indicate that the superior adapt themselves to their new homes better than the average and dull, but chance would perhaps account for this.

Larger numbers of evacuees will have to be tested before definite conclusions can be reached on this point, for at the moment the Cambridge results suggest that the superior adapt less well than the average and dull,¹ while our own results indicate that they adapt better. In neither group are the differences between the more and less intelligent evacuees statistically significant.

(d) NEUROTIC SYMPTOMS IN THE GROUP EXAMINED.

There was very little homesickness and anxiety among these children, probably due, in the case of the girls, to the head mistress being an excellent mother substitute. There were 5 cases of incontinence, 3 of anger neuroses and 4 or 5 children showed other neurotic symptoms.² There was a high percentage (13 per cent) of theft among the older boys, but there were too few delinquents or children suffering from neurotic symptoms to discover whether these conditions were related to satisfactoriness of adjustment.

IV.—SUMMARY AND CONCLUSIONS.

(1) Although seven months after evacuation only 63 of the 237 children who had been evacuated remained in the area studied, the evacuation has nevertheless proved successful with the majority of the children remaining. Of the 100 children examined only 17 failed to settle down happily in their foster homes.

(2) Sex and age (in the range investigated), the presence of local children and siblings in the billet and the size and financial status of the home family did not seem to have any constant or regular relation to the satisfactoriness in the adjustments made by the evacuees to their new homes.

(3) Frequent changes of billet, the presence of other evacuees or of many other children in the household were conditions associated with maladjustment among the evacuees.

¹ *Loc. cit.*, pp. 107-8.

² The children from the West Riding reported on by Mrs. Anthony showed similar symptoms.

(4) Frequent visits from their parents did not appear to prevent the children from adapting themselves to their foster homes.

(5) Children of superior intelligence appeared to adapt rather better than the average and dull children, but the degree of association between intelligence and adjustment is small.

(6) The incidence of neurotic symptoms was low and delinquency moderately high in the group considered. The delinquents appeared to establish fairly satisfactory relations with their foster parents.

(7) A comparison of the cases studied both in this inquiry, and in others carried out by our colleagues, and also in the independent inquiries initiated at Cambridge and elsewhere,¹ indicates that certain common factors, making for satisfactory and unsatisfactory adjustment respectively, recur in case after case and in district after district. This suggests that, although there are appreciable individual differences in the way different children react to the one and same condition, nevertheless short leaflets on general principles and oft-recurring problems, addressed to billeting officers and to foster parents, would be of great assistance in avoiding misfits and indicating how to deal with particular difficulties.²

V.—APPENDIX ON STATISTICAL METHODS.

The particular statistical formulæ and methods, appropriate to educational data such as the present, have been summarized and explained in the Appendix to Burt's *Backward Child* (pp. 658–74); and therefore need not be set out in detail here. It is sufficient to note that, for the purposes of testing statistical significance and estimating the degree of association, all such tables can usually be treated as 2×2 tables. Thus, for the calculations described in the text, the ratings zero (0) and minus (—), which were allotted separately to a very few children only, have been pooled throughout.

With these 'fourfold tables' the procedure recommended by Burt is (i) first to calculate the probability of the differences observed being attributable solely to chance fluctuations (either by computing χ^2 and thence finding P , or, more accurately, by deriving P from the hypergeometric series which arises in the double sampling), and then (ii) to estimate the degree of association by calculating either (a) the tetrachoric coefficient of correlation, r_t (when the qualities assessed have presumably an approximately normal distribution) or else (b) (when the frequencies are discontinuous and concentrated at two single points, as in the case of sex) the product-moment coefficient.

¹ We should like to repeat our indebtedness to Mrs. Anthony, Miss Cast, Miss Hume, Dr. Wagner, and to many other former students of the department for their reports or communications and to Dr. Isaacs and Miss Clement Brown for information about the work at Cambridge.

² Such roneo'd leaflets, intended primarily for particular areas, have, as a matter of fact, already been drawn up by Prof. Burt and others, dealing either with the general problem or with particular difficulties (such as incontinence), and have been found extremely serviceable. Copies are obtainable from the Department.

When the lines of division are (or can be) drawn so that the sub-totals should in theory be equal (as in the case of sex), Yule's 'coefficient of colligation,' ω (the product-moment correlation for an equalized table) or some equivalent formula may be employed. These coefficients can be obtained to a sufficient degree of accuracy by using an Abac or Graph, such as are obtainable from the laboratory (a printed abac is given in *Mental and Scholastic Tests*, P. S. King, 1921, p. 219, and similar printed *Computing Diagrams* have since been published by Thurstone, Univ. Chicago Book Store, 1933).

Here we have thought it sufficient to calculate χ^2 (duly corrected for discontinuity, where necessary, see Burt, *loc. cit.*, p. 663), and to use the product-moment coefficient throughout. If P is greater than .05, the association may be regarded as significant. With a fourfold table the product-moment correlation is equal to the root of the mean square contingency, i.e. (with the usual notation)

$$r = \frac{Nq - Qn}{\sqrt{PQmn}} = \phi = \sqrt{\frac{\chi^2}{N}}$$

For a rough survey such as the present, based on small numbers, we have thought it simplest to keep to this coefficient. We have, however, also calculated r_t and ω , and find as a rule no very great difference. As might be expected, the use of ϕ if anything makes the correlation appear slightly smaller than would be suggested by the figures given by the alternative formulæ. Thus we err rather on the side of caution.

It should be emphasized that the problem of causation is not completely stated or disposed of by calculating one or two numerical indices. As noted in the text, conditions that are favourable for one child may be unfavourable for another (e.g., the company of other children in the billet); and a single coefficient of correlation cannot express, and may even obscure, this double effect.

AN INVESTIGATION INTO THE RELATIONSHIP BETWEEN FERTILITY AND INTELLIGENCE.*

BY GERARD S. A. O'HANLON
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- I.—*The problem.*
- II.—*The data.*
- III.—*The group.*
- IV.—*Fertility.*
- V.—*Correlation between fertility and intelligence.*
- VI.—*Environmental factors selected for examination.*
- VII.—*Interpretation of correlation coefficients.*
- VIII.—*Elimination of factors involved.*
- IX.—*Interpretation of partial correlation coefficients.*
- X.—*Summary of results and conclusions.*

I.—THE PROBLEM.

MANY investigations have been conducted within recent years on the relation between intelligence and size of family, e.g., those of Bradford,¹ Terman,² Sutherland and Thomson,³ and Sutherland.⁴

More recently in this *Journal* E. J. G. Bradford published a survey and summary of a wide range of enquiries entitled "The Relation of Intelligence to Varying Birth-Rate in Different Social Grades." He found a general agreement on the following points:

- (a) That the larger the family, the lower the intelligence of the members of the family (on the average); and
- (b) The greater the intelligence of the children of an occupational class, the lower the fertility of that class.⁵

Most of the investigations hitherto conducted have, however, more or less neglected the influence of environment upon both intelligence and fertility, if such an influence exists, as is quite reasonable to suppose. The main purpose of this thesis is, firstly, to discover whether there is to be found in a selected group an inverse correlation between intelligence and fertility, and secondly, if such is the case, to see if this correlation might be affected by possible environmental causes.

*Thesis presented in part fulfilment of the requirements for the degree of Bachelor of Education, Edinburgh University.

¹ *Forum of Education*, 1925, Vol. 3, p. 196.

² *Genetic Studies of Genius*, 1925, Vol. 1.

³ *British Journal of Psychology*, 1926, Vol. 17, p. 81.

⁴ *Journal of Educational Psychology*, 1929, Vol. 20, p. 81.

⁵ *This Journal*, 1937, Vol. 7, p. 229.

II.—THE DATA.

The data used were those collected by the late Dr. Shepherd Dawson in making a slum-clearance survey in Glasgow some years ago.¹ Over 1,000 children between the ages of five and eight years, whose parents were moving to a new housing scheme, were given tests, scholastic and intelligence (Burt's Graded Vocabulary Test 1, Burt's Arithmetic Test 8, and the Binet Intelligence Tests as revised and extended by Terman), all administered by the same person and individually. Children of 5-8 years were selected since it was thought that they would react to an environmental change more quickly than older children, and it was the intention of Dr. Dawson to have all these children re-tested after some years in their new environment. Unfortunately many were untraceable after two years, and when re-testing took place only about 300 cases were available.

In addition fullest details of the home environment were taken : of the father ; of the mother ; of all births and deaths in the family ; of the economic status of the family ; of the child, health, etc. ; forming a most complete and thorough survey of the social milieu of the subjects.

III.—THE GROUP.

The group in its final composition consisted of 293 cases. The smallness of this number compared with the original number tested was due to the fact that only those cases for whom full information was given concerning their environment both before and after changing to the new housing scheme were admitted, for it was thought that it might later be desired to make an inquiry into the effect of change of environment. In addition, where siblings occurred only one child was taken from each family.

The distribution of I.Q.'s is shown in Table I, and appears to be almost normal, with perhaps a slight positive skewness.

TABLE I.
FREQUENCY DISTRIBUTION OF I.Q.'S.

I.Q.	N.	I.Q.	N.
61- 65	7	101-105	22
66- 70	2	106-110	13
71- 75	15	111-115	7
76- 80	25	116-120	4
81- 85	40	121-125	2
86- 90	65		
91- 95	48	TOTAL..	293
96-100	43		

¹ Permission to use Dr. Shepherd Dawson's data was given by the Scottish Council for Research in Education, to which the writer expresses his warm thanks.

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Now the group with which we are dealing consists of people living in 'condemned' slum houses. They form for the most part the lowest occupational group, namely, that of casual labourers. Hence in our group we would expect a low mean I.Q. and also a narrower scatter, since it is a specially selected sample of a whole distribution. This is in fact the case, the mean I.Q. being 90.52 and the standard deviation 11.15 as compared with the mean I.Q. of 100 and a standard deviation of 16 or 17 for the whole country. It seems probable, therefore, that this is a reasonable sample of this occupational and social group.

There is one drawback which we must face, viz., that many of the families with which we are dealing are uncompleted. To obviate this difficulty we could select children whose mothers at the time of testing were forty-five years of age or older, at which age families are supposed to be complete. If we do this, however, we obtain a very small group of only twenty-eight cases, too small to be of statistical significance. To discover whether there is any difference between taking the group as a whole and taking only those with mothers of forty-five and over, Table II was drawn up, giving the means and standard errors of all the particulars relating to births and deaths of the two groups and the differences between these means.

TABLE II.

	M_I	M_{II}	$M_{II} - M_I$	ζ_I	ζ_{II}	ζ_{MI}	ζ_{MII}	$\frac{\zeta_{MI}^2}{\zeta_{MI}^2 + \zeta_{MII}^2}$	$\zeta_D = \sqrt{\frac{\zeta_{MI}^2 + \zeta_{MII}^2}{\zeta_{MI}^2 + \zeta_{MII}^2}}$	Significance Difference
Miscarriages..	.43	.89	.46	.818	1.118	.0478	.2113	.0469	.216	No.
Still Births ..	.15	.25	.10	.505	.630	.0295	.1191	.0151	.123	No.
Children Dead	1.38	2.96	1.58	1.590	2.120	.0929	.4006	.1691	.401	Yes.
Total Deaths	2	4.1	2.10	2.003	2.380	.1170	.4498	.2160	.465	Yes.
Children Alive	4.87	6.39	1.52	1.985	2.042	.1160	.3859	.1624	.403	Yes.
Live Births	6.16	9.07	2.91	2.771	3.180	.1619	.6010	.3874	.622	Yes.
Total Births	6.3	9.25	2.95	2.834	3.360	.1656	.6350	.4306	.656	Yes.
Pregnancies	6.8	10.04	3.24	3.004	3.300	.1755	.6236	.4197	.648	Yes.

I.—All cases, $N_I = 293$.

II.—Mothers over 45, $N_{II} = 28$.

M_I = Means of Group I.

M_{II} = Means of Group II.

ζ_I = Standard errors of Group I.

ζ_{II} = Standard errors of Group

The two groups differ significantly in all the details relating to births and deaths except in miscarriages and still births. This would suggest that we are not entirely justified in pooling all the families together, but that we should work with the smaller group where the likelihood of having completed families is much greater than in the other. The small number of cases, however, makes this course useless. It should further be noted that, as in all experiments dealing with children, sterile unions do not appear; and moreover, smaller families have a smaller chance of being represented in our data. These are admitted defects.

IV.—FERTILITY.

Before we inquire whether there is any correlation between intelligence and fertility let us examine what we mean by fertility. There seem to be five methods of measurement in current use:

- (1) The number of children in the family alive at the time of testing;
- (2) The number of live births;
- (3) The total number of births;
- (4) The total number of pregnancies;
- (5) The frequency of pregnancies.

The last, the method proposed by Dr. Shepherd Dawson, is the ratio of the number of pregnancies to the number of years the mother has been married at the birth of the child tested. Thus fertility is here represented by the frequency of production rather than by actual 'gross' production. But there must be some doubt as to whether we are justified in taking this as a true measure of fertility and assuming that because a woman has a certain frequency of child-bearing at one period of her life she will continue to have the same frequency. In this connection it would be interesting to know the rate of change of frequency of births during the years of marriage during which births are possible.

The fourth measurement is found by adding together the number of live births, miscarriages and still births. This gives a measure rather of fecundity or potential productiveness than of fertility or actual productiveness.

The third method, that of measuring the total number of births, is in our opinion the best, for it gives a measure of the total possible lives, i.e., live births plus still births. The second method omits still births and in doing so decreases the fertility unnecessarily, for surely a still birth is as much of a birth as a live one.

V.—CORRELATION BETWEEN FERTILITY AND INTELLIGENCE.

Though the third method of measuring fertility was preferred, correlations between fertility and intelligence were worked out by all five methods. These correlations were also ascertained for the small group of 28.

TABLE III.

<i>Correlation of I.Q. and</i>	<i>All Mothers (293).</i>	<i>Mothers 45 and over (28).</i>
Children in family alive at time of testing	—·137 ± ·04	—·291 ± ·12
Children born alive	—·218 ± ·04	—·402 ± ·11
Total number of births	—·207 ± ·04	—·413 ± ·11
Total number of pregnancies	—·197 ± ·04	—·418 ± ·11
Pregnancies ÷ years married	—·125 ± ·04	—·233 ± ·12

From Table III it is apparent that no matter how we measure it there is always a negative correlation between fertility and intelligence. We can see this more clearly if we divide our subjects into four groups, those of I.Q. greater than 115, those of I.Q. 114–85, those of I.Q. 84–70 and those of I.Q. less than 70, as in Table IV.

In the highest and lowest groups we have only six and nine families respectively, so that we must consider these two columns as statistically useless. Taking the moderate and dull groups, i.e., those groups whose mean I.Q.'s are 100 and 77 respectively, we can easily see the trend towards higher fertility in the lower ranges of intelligence.

It may be argued that since the number of fatalities increases with decline in I.Q. the trend will be lessened. The increase, however, is not sufficient to counterbalance the increase in the number of pregnancies which is also encountered with decline of I.Q. Thus, in Table IV the difference in mean number of deaths is ·602 and in the mean number of pregnancies is 1·571. And also, considering mean number of survivors per family, it is higher in the case of lower I.Q.'s, 5·412 as compared with 4·717.

That a negative correlation exists between intelligence and fertility seems to be the case, no matter how we measure the relationship. Why there should be such a correlation is, however, the question which we must ask.

TABLE IV.
RELATIONSHIP BETWEEN I.Q. AND SIZE OF FAMILY.

I.Q.	Above 115.		114-85.		84-70.		Below 70.	
No. of Families.....	6.		198.		80.		9.	
	Total No.	Mean per Family.	Total No.	Mean per Family.	Total No.	Mean per Family.	Total No.	Mean per Family.
Pregnancies	42	7.00	1253	6.329	632	7.900	70	7.778
Births	36	6.00	1168	5.899	574	7.175	66	7.333
Live Births.....	33	5.50	1151	5.814	560	7.000	60	6.667
Survivors	23	3.82	934	4.717	433	5.412	43	4.778
Deaths	13	2.17	235	1.186	143	1.788	17	1.889
Still Births	3	.50	20	.101	14	.175	5	.556
Miscarriages	6	1.00	84	.424	19	.488	6	.667
Total Fatalities.....	19	3.17	343	1.732	201	2.512	28	3.111

From the correlation alone we cannot conclude which is cause and which is effect. Nor indeed does it follow that either is cause or effect.

If two quantities A and B are correlated then there are three possible causal relationships :

- (1) A is the cause of B ;
- (2) B is the cause of A ;
- (3) A and B are both caused by C, some other factor or group of factors.

To consider an example : within recent years infant mortality has decreased, and so has the number of births. We might be tempted to say that it is *because* of the decrease in birth-rate that infant mortality has decreased, or *vice versa*, but neither of these conclusions need be true. Research has shown that this decrease in mortality is due principally to the discovery that the bacillus of Morgan causing infantile enteritis, a disease rife in infants, is carried by the common fly. Now, with increasing use of petrol, horse traffic has diminished so that there has been less manure in the streets of our cities. Thus there have been fewer flies, the chances of infection have been reduced, and infant mortality has shown a decrease.

The conclusions 1 or 2 must not be drawn before 3 has been fully investigated. We shall therefore endeavour as far as possible with the data at our disposal to find out whether in the case of intelligence and fertility such factor or factors exist, and also what their relative effects may be.

Since the original purpose of this inquiry was to discover what would be the effect of change of environment upon intelligence the group chosen was as homogeneous as possible, for it was thought that individual differences in it would be small and negligible. This choice has proved rather a drawback to our own particular investigation since we believe that to some extent differences of environmental influence affect both fertility and intelligence, and so larger differences of environment were desirable or none at all. The differences which exist are too large to be neglected and too small to yield large correlations.

VI.—ENVIRONMENTAL FACTORS SELECTED FOR EXAMINATION.

The factors which, it was thought, might have most effect on either intelligence or fertility were as follows :

(1) *Nutrition*.—There are conflicting opinions regarding the effect of nutrition on intelligence. Hunt, Johnson and Lincoln, Dowd Nicholls, Stalnoben and Stope have each concluded that "under-nourished children, whatever their other handicaps, are no whit inferior mentally to well-nourished children of the same race and social status.¹" On the other hand it seems reasonable to assume that malnutrition will affect performance in intelligence and achievement tests. It is often observed by teachers that those pupils who are consistently under-nourished are the most backward in class. Though nutrition or lack of it may not affect intelligence it may still influence the application of the intelligence to the problems given, and hence must be taken into account in the course of our own investigation.

(2) *Income*.—It is possible that many parents may have small families because of their high economic status, and since nett income is the best index of this factor, it will be necessary to consider it. An additional reason is that the income of an occupational group is more likely to be determined by intellectual capacity than by any other factor.

(3) *Room Space*, i.e., the ratio of the number of rooms to the number of persons living in the house. Shepherd Dawson in an investigation found a small positive correlation between I.Q. and Room Space. In

¹ R. B. CATTELL : *Eugenics Rev.*, 1936, Vol. 28, No. 3, p. 201.

addition it is possible that parents would limit their families according to the amount of space at their disposal. On the other hand it is possible that people with larger families would make a greater effort to increase their room space than people with small families.

(4) *Age at Marriage*.—Steckel found that there was a significant relationship between I.Q. of children and the ages of their parents. Children born of very young parents were less intelligent than those of older parents.¹

This factor will also have an effect on the total number of births for the later the age at marriage the smaller is the family expected to be.

(5) *Number of years the mother was married* at the birth of the child tested.—This factor will have a large effect on the total number of births. In addition it may have an effect upon the intelligence of the child in so far as it gives an index of the birth order of the child. L. L. Thurstone² discovered that the later born children are on the whole more intelligent than the earlier born, though R. B. Cattell³ holds that there is no such relationship.

These five factors were taken together with I.Q. and total number of births and all the correlations were worked out (Table V).

TABLE V.*

	2. <i>Room Space.</i>	3. <i>Nutri- tion.</i>	4. <i>Income.</i>	5. <i>Births.</i>	6. <i>Age at Marriage</i>	7. <i>Years Married.</i>
1.—I.Q.	·1540	·1816	·0089	—·2070	·0600	·0560
2.—Room Space (Rooms/Persons)		·1668	—·0652	—·2337	—·0800	—·0608
3.—Nutrition of of Child			·0113	—·1751	—·0743	—·1154
4.—Income				·2817	·0048	·3961
5.—Births					—·1130	·6676
6.—Age at Marriage						—·2094

*293 cases. A correlation of ·117 is three times its probable error.

(In the nutrition correlations, however, there were only 280 cases.)

¹ MINNIE L. STECKEL: "Parental Age and Intelligence of Offspring."—*Journ. of Educ. Psychol.*, 1931, 22, pp. 212, et seq.

² L. L. THURSTONE and R. L. JENKINS: "Birth Order and Intelligence."—*Journ. of Educ. Psychol.*, 1929, 20, pp. 641-651.

³ R. B. CATTELL: *Eugenics Rev.*, 1936, 28, No. 3, p. 202.

VII.—INTERPRETATION OF CORRELATION COEFFICIENTS.

As we have already emphasized it is very difficult and dangerous to draw conclusions as to causality from correlation coefficients. We may, however, permit ourselves some remarks and surmises concerning some of those in our table.

r_{12} *I.Q. and Room Space*, $\cdot 154 \pm \cdot 039$.—This value shows that there is some slight connection between the congestion in the house and intelligence. It may mean that the less intelligent live in smaller houses because they have not the foresight to obtain bigger ones, or perhaps because of the income; but the correlation between income and room space is not significant. On the other hand it might equally well mean that the poor housing has a direct effect upon the intelligence of the children. This is the view held by those who are anxious to prove that improvement in the conditions of living will raise the intellectual level.

r_{13} *I.Q. and Nutrition* $\cdot 1816 \pm \cdot 039$.—This indicates that the better nourished children are of higher intelligence, a result which one would expect, but which R. B. Cattell and others failed to find.¹ It does not, of course, necessarily follow that poor nutrition is a *cause* of low mentality, but the indications are in this direction rather than in the other, for clearly the child's nutrition does not depend on his intelligence, but perhaps on his mother's, or on the school authorities. On the other hand nutrition is conditioned by numerous other factors such as income, number in family, etc., and taking this into consideration we should not be justified in drawing any conclusions at present.

r_{23} *Room Space and Nutrition*, $\cdot 1668 \pm \cdot 039$.—This is a correlation we would expect, for if the room space increases it is likely to have been brought about by an increase in income, and hence an increase in nutrition would most probably take place at the same time. But this explanation is not borne out by the insignificant correlation between room space and income.

r_{24} *Room Space and Income*, $-\cdot 0652 \pm \cdot 0395$.—This is an insignificant correlation, and shows that there is no relationship between income and the number of rooms per person in the house. It will be noticed that the families with larger incomes tend to have more children. Apparently therefore the increased income only enables them to keep the same standard of room space, not to improve it. Or it may be that these people either do not try to get away from their environment when their financial circumstances improve, or else that they cannot better their home conditions, perhaps because of lack of larger houses or because of

¹ *Eugenics Review*, 1936, 28 (3), p. 202.

their place of employment. In the latter case, with improved housing conditions, there would arise a positive correlation. Here an interesting point arises. Do we in actual fact want a positive correlation here? We do not think so, for room space ought to remain a constant quantity, or at least should have a fixed minimum value for a healthy population to result. Thus income *should* not have any significant bearing upon room space, for such a correlation would imply very poor housing conditions resulting from small incomes. This is what we would normally expect to find, but is not so in this population, probably for the reasons we have given above.

r_{37} *Nutrition and Years married at Birth of Child tested*, -0.1154 ± 0.039 .—This would seem to indicate that the later born children are less well nourished than the earlier born. This may be due to the fact that there is a larger family to feed or to some natal factor.

r_{45} *Income and Total Births*, 0.2817 ± 0.036 .—Probably this means only that both the number of births and the income increase with the time, the latter either because the wages of more experienced men are somewhat higher, or because the first born children have begun to earn. In addition many of the fathers were in receipt of 'dole' allowances or parish relief, which being based on size of family, would tend to augment this correlation.

r_{47} *Income and Years Married*, 0.3961 ± 0.033 .—Here the explanation is probably much the same.

VIII.—ELIMINATION OF FACTORS INVOLVED.

We can see that the interpretation of many of the correlation coefficients which we have obtained is very involved, and that in most cases we must take into account other factors which may have an indirect effect on them. Thus if we wish to obtain the true correlation between two variates we must eliminate the effect due to the other factors. This is done by partialling out the other variates, i.e., rendering their effect constant. The resultant coefficient is called the 'partial correlation coefficient.'

There are different methods of partialling out, but the most convenient is that of pivotal condensation, invented by Dr. Aitken. Given a matrix of correlation coefficients we may by this method find the reciprocal matrix, and hence the partial correlation coefficients of any two of the variates with all the others partialled out. If the elements in the reciprocal matrix are (using a common convention) indicated by 'raised

suffixes ' we have for the partial correlation of variates i and j with all other variates constant the value

$$r_{ij.abcd\dots} = \frac{r^{ij}}{\sqrt{r^{ii} r^{jj}}}$$

The reciprocal matrix (obtained by Aitken's Method) is found to be as follows :

1.1726	-.0773	-.1797	.0308	.4636	-.1298	-.4398
-.0773	1.1091	-.1267	.0459	.3244	.0870	-.1594
-.1797	-.1267	1.0926	-.0968	.0673	.1206	-.1470
.0308	.0459	-.0968	1.2080	-.0193	-.1182	-.5004
.4636	.3244	.0673	-.0193	2.1363	-.0547	-1.4283
-.1298	.0870	.1206	-.1182	-.0547	1.0890	.3379
-.4398	-.1594	.1470	-.5004	-1.4283	.3379	2.2543

and hence the partial correlation coefficients each with all the other variates ' partialled out ' are as shown in Table VI.

TABLE VI.

PARTIAL CORRELATION COEFFICIENTS WITH ALL OTHER VARIABLES PARTIALLED OUT.

	2. Room Space.	3. Nutri- tion.	4. Income.	5. Total Births.	6. Age at Marriage	7. Years Married.
1.—I.Q. ....	.0643	.1588	-.0258	-.2929	.1149	.2705
2.—Room Space...		.1265	-.0397	-.2108	-.0792	.1008
3.—Nutrition.....			.0843	-.0441	-.1106	-.0937
4.—Income .....				.0128	.1030	.3032
5.—Total Births ..					.0359	.6525
6.—Age at Marriage						-.2157

From these we may draw, though still with caution, further conclusions about the forces at work. For example it will be noted that the partial correlation coefficient between I.Q. and total number of births, with all the other variables removed, is $-.2929$, a value which is lower (i.e., further removed negatively from zero) than the original value of $-.2070$. From this result it is evident that the environmental factors must have had some effect upon the correlation in question. To find the effect of each of these factors separately it was decided to find the partial correlation coefficients between I.Q. and total number of births when the other factors were partialled out in turn, i.e., to find $r_{15\cdot3}$, $r_{15\cdot34}$, $r_{15\cdot342}$, etc.¹

Table VII gives the resulting partial correlation coefficients between I.Q. and number of births in family.

TABLE VII.

	r .	Difference.	Factor partialled out.
r_{15}	$-.2070$		
$r_{15\cdot3}$	$-.1810$	$.0260$	Nutrition: decreases the negative correlation.
$r_{15\cdot34}$	$-.1911$	$-.0101$	Income: increases the negative correlation.
$r_{15\cdot342}$	$-.1703$	$.0208$	Room Space: decreases the negative correlation.
$r_{15\cdot3426}$. . .	$-.1598$	$.0105$	Age at Marriage: decreases the negative correlation.
$r_{15\cdot34267}$. .	$-.2929$	$-.1331$	Years married at birth of child tested: increases the negative correlation.

Considering these results it would appear that malnutrition, room space and age at marriage have a negative effect on the correlation, because when they are removed the correlation comes nearer to zero. If, however, we take into account income and the number of years the mother is married at the birth of the child tested, then this negative tendency is more than accounted for by a swing in the positive direction. The effect of income is practically negligible when compared with that due to the number of years married. The only reason why this should be so would be a positive correlation between (a) I.Q. and years married and (b) between years married and total births.

¹ The $(n-1)$ th slab in Aitken's pivotal condensation gives the reciprocal matrix of the first $(n-1)$ variates on eliminating the first row and the last column. The $(n-2)$ th slab gives the reciprocal matrix of the first $(n-2)$ variates on eliminating the first two rows and the last two columns. And similarly for the other matrices. Thus from the $(n-1)$ th reciprocal matrix can be found the partial correlation coefficients for the first $(n-1)$ variates.

- (a) In Table V this correlation is $\cdot056 \pm \cdot0395$, an insignificant one, so it would seem that other factors have obscured it. When we calculate the partial correlation coefficient, however, it is found to be $\cdot2205$, a value which confirms our findings.
- (b) This of course follows automatically, the correlation here being $\cdot6676$ and $\cdot6525$ (partial).

XI.—INTERPRETATION OF PARTIAL CORRELATION COEFFICIENTS.

Some of the other crude correlation coefficients have been altered considerably by partialling out, and these we shall now briefly discuss.

r_{12} *I.Q. and Room Space*, $\cdot0643 \pm \cdot0393$.—Here the formerly significant correlation ($\cdot1540$) has been reduced to insignificance. Hence it would seem that taking all things into consideration intelligence is little, if at all, affected by congestion in the home.

r_{18} *I.Q. and Nutrition*, $\cdot1588 \pm \cdot0395$.—This correlation is still positive and significant after all the other factors have been partialled out. Hence we can conclude that better nourished children are the more intelligent for reasons which we have stated above.

r_{16} *I.Q. and Age at Marriage*, $\cdot1149$.—This correlation coefficient indicates that the more intelligent people tend to marry later on in life than the less intelligent. This may be explained by the fact that the more intelligent usually have a longer preparation for a career, and so they are much older before they can afford to marry; or that they wish their children to have a better start in life than they themselves had, and so will wait till they have a larger income before marrying. This is borne out by observing that there is now a small correlation of $\cdot1030$ between Income and Age at Marriage.

r_{17} *I.Q. and Number of Years married at Birth of the Child tested*, $\cdot2705$.—Here we have the appearance of a significant positive correlation which previously did not exist. It would follow from the correlation either (a) taking the child's I.Q. as an index of the mother's I.Q., that the more intelligent mothers are married for a longer time before they produce children. The reason may be that they have to keep up a certain standard of living and so cannot afford to have children until they have saved a certain amount of money; or (b) that the children who are born later in married life are more intelligent than those who are born earlier, or (c) that the more intelligent mothers can use contraceptives more effectively.

r_{45} *Income and Total Number of Births*, $\cdot0128$.—Here a significant correlation ($\cdot2817$) has been reduced nearly to zero. This would suggest

that those who have larger families do not have them because they have larger incomes and can afford to have large families, a result which agrees with our previous findings.

From these partial correlation coefficients we may then draw three conclusions with respect to the I.Q. of the child.

- (1) The intelligence of the child is unaffected by congestion in the home.
- (2) The birth order of a child may have a certain effect on the intelligence of the child, such that later born children will be the more intelligent.
- (3) Malnutrition seems to have some slight adverse effect on the child's intelligence, though of this we cannot be absolutely certain, since there may be factors which we have not considered.

The only fact we have been able to deduce as regards the total number of births is that it depends upon the number of years the mother is married, an obvious conclusion.

The Regression Equations.—Suppose now we wanted to find the I.Q. of a child whose social milieu we know. We could make an estimate of his I.Q. by finding a regression equation in terms of the other six variates. If his scores in these are inserted in the equation then the result gives the best estimate of the child's I.Q. (Scores in ϵ units.)

Thus we may find in our investigation seven regression equations, one for each variate. The regression coefficients may be found directly from the reciprocal matrix given in a table above, by multiplying each row of $R - I$ by the reciprocal of the respective diagonal element and by -1 .

We thus obtain the regression equations :

I.Q.	$\hat{x}_1 =$	$\cdot 07x_2$	$+ \cdot 15x_3$	$- \cdot 03x_4$	$- \cdot 39^*x_5$	$+ \cdot 11x_6$	$+ \cdot 37^*x_7$
Room Space ..	$\hat{x}_2 =$	$\cdot 07x_1$	$+ \cdot 11x_3$	$- \cdot 04x_4$	$- \cdot 29x_5$	$- \cdot 07x_6$	$+ \cdot 14x_7$
Nutrition	$\hat{x}_3 =$	$\cdot 16^*x_1$	$+ \cdot 12x_2$	$+ \cdot 09x_4$	$- \cdot 06x_5$	$- \cdot 11x_6$	$- \cdot 13x_7$
Income	$\hat{x}_4 =$	$- \cdot 02^*x_1$	$- \cdot 04x_2$	$+ \cdot 08x_3$	$+ \cdot 02x_5$	$+ \cdot 10x_6$	$+ \cdot 41x_7$
Total Births ..	$\hat{x}_5 =$	$- \cdot 22x_1$	$- \cdot 15x_2$	$- \cdot 03x_3$	$+ \cdot 01x_4$	$+ \cdot 02^*x_6$	$+ \cdot 67x_7$
Age at Marriage	$\hat{x}_6 =$	$\cdot 12x_1$	$- \cdot 08x_2$	$- \cdot 11x_3$	$+ \cdot 11x_4$	$+ \cdot 05x_5$	$- \cdot 31x_7$
Years Married .	$\hat{x}_7 =$	$\cdot 19^*x_1$	$+ \cdot 07x_2$	$- \cdot 06^*x_3$	$+ \cdot 22x_4$	$+ \cdot 63x_5$	$- \cdot 15x_6$

($\cdot 02^*$ means that the four-place figures are $\cdot 0250$ so that one cannot decide between $\cdot 02$ and $\cdot 03$.)

NOTE.—Four places of decimals were retained throughout the calculation but only two places have been given in the results.

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Note on the estimate of x_1 (I.Q.).—It is interesting to note that in this estimate total number of births and number of years married show the largest loadings, $-.3954$ and $.3751$ respectively. We cannot draw any causal conclusions from this regression equation, but we can support those we have already drawn. Thus the loading in Room Space is $.0692$, a negligible quantity compared with the loading of Births. This verifies that congestion has no effect on the intelligence of the child when compared with the other variates. Similarly the loading of Nutrition $.1532$, though not so large as that of Births, nevertheless indicates that there is some degree of correspondence between I.Q. and nutrition, and again verifies our conclusion that I.Q. is affected adversely by malnutrition. The importance of the effect of birth order on intelligence is shown by the large loading ($.3751$) which it possesses.

It must be borne in mind, however, that the loadings of a regression equation depend upon the other variates present and we must not conclude that the variate having the largest loading will in itself give the best estimate.

To illustrate this when we calculate the regression coefficient of I.Q. on years married alone and when combined with the other variates, we obtain the following :

<i>I.Q.</i>	<i>Years Married.</i>	<i>Total Births.</i>	<i>Nutrition.</i>	<i>Room Space.</i>	<i>Age at Marriage.</i>	<i>Income.</i>	<i>Multiple Correlation Coefficient</i>
	.06						.06
	.35	— .44					.33
	.35	— .41*	.15				.36
	.34	— .40	.14	.06			.37
	.36*	— .40	.15	.07	.11		.38
	.38	— .39*	.15*	.07	.11	— .05	.38

It would appear from this that so far as estimating I.Q. from the social environment is concerned room space, age at which mother is married and income are of little prognostic value when taken with the other variates. The single variate giving the best estimate of I.Q. is, of course, total births, since it has the largest correlation with I.Q. ; and the best battery, years married, total births and nutrition.

In conclusion I would like to thank Professor Godfrey Thomson and Mr. W. G. Emmett for advice and encouragement, and the Director of the Scottish Council for Research in Education, Dr. R. R. Rusk, and his staff for hospitality and assistance.

X.—SUMMARY OF RESULTS AND CONCLUSIONS.

(1) This paper is based on data collected by the late Dr. Shepherd Dawson in Glasgow, and concerns 293 children of ages five to eight whose intelligence quotients were found, and about whom unusually full particulars were available of the home environment, of the births and deaths in the family, the medical history, the father, the mother, the income, etc., forming a thorough survey of the social milieu of the subjects. Their mean I.Q. (they came from a slum clearance area) was 90·5.

(2) The main fact emerging is that the larger the family the lower the intelligence of the children tended to be. The correlation between size of family and I.Q. of the child tested, for the total number of births, was $-207 \pm \cdot 04$ for the whole group of 293, and $-413 \pm \cdot 11$ for the group, twenty-eight in number, with mothers over forty-five years of age, whose families might be regarded as complete.

(3) Correlation coefficients were calculated between (1) I.Q., (2) Room Space, (3) Nutrition, (4) Income, (5) Total number of births, (6) Age of mother at marriage, and (7) Years married at birth of child tested.

(4) Partial correlation coefficients were also calculated, keeping various variables constant, including the partial correlation coefficients between each pair of variables for *all* others constant.

(5) It was concluded that intelligence is little, if at all, affected by congestion in the home; that better nourished children are more intelligent; that more intelligent people in this class tend to marry later in life than the less intelligent; and that possibly the later born children are the more intelligent. Regression equations tend to confirm these findings. The cumulative effect of the components of the environment makes very little difference to the negative correlation between I.Q. and size of family.

A COMPARATIVE INVESTIGATION INTO THE FACTORS INVOLVED IN MATHEMATICAL ABILITY OF BOYS AND GIRLS.

By A. M. BLACKWELL.

PART II.

IV.—THE RESULTS AND THEIR STATISTICAL ANALYSIS.

(b) *Rotation of the axes by the graphical method.*

- (i) *Examination of the factorial matrix obtained from the girls' results.*
- (ii) *Examination of the factorial matrix obtained from the boys' results.*
- (iii) *Locating the axes.*

V.—*The interpretation of the factors.*

VI.—*Summary and conclusions.*

(b) *Rotation of the axes by the graphical method.*

When the raw factors have been extracted from the correlation matrix, the next problem is to rotate the co-ordinate axes to primary axes so that the greatest psychological significance may be attached to the factors obtained from the two sets of results—the girls' and the boys'.

(i) *Examination of the factorial matrix from the girls' results.*

An inspection of Table IV reveals firstly that the smallest number of independent factors necessary to account for the correlations is four, factor I appearing most important, factor II next in importance, and so on. Factor I is positively correlated with every test in the battery, and, except in test 10, the correlations are reasonably high. Factor II has certain positive and certain negative correlations. It is positively correlated with the purely mathematical tests—tests 1, 2, 3 and 5—the correlations ranging between $\cdot304$ and $\cdot381$, and negatively correlated with spatial and three verbal tests—tests 4, 7, 9 and 10—the correlations lying between $-\cdot297$ and $-\cdot379$. The verbal tests seem to be divided in their relationship to factor II, test 6 has an almost insignificant positive correlation of $\cdot008$, test 8 a small positive correlation of $\cdot153$, whilst the remainder—tests 7, 9, 10—have negative correlations in the region of $-\cdot3$. Factor II therefore appears to mark a distinction between the mathematical tests on the one hand and the spatial and some verbal tests on the other. The notable

loadings of factor II are the four positive loadings in tests 1, 2, 3 and 5, and the negative loadings in tests 4, 7 and 9. In the case of factor III it seems significant that the only tests positively correlated with this factor are verbal tests.

A further point emerging from a preliminary inspection of this factorial matrix is that several of the tests tend to group together.

In order to see more clearly which tests tend to group together diagrams were prepared, each representing graphically in a circle of unit radius the positions of the projections of the termini of the respective test vectors in a plane determined by two of the orthogonal axes.

When several tests fall close together they form what is termed a "functional cluster."¹ When such a cluster is found the tests comprising it can be regarded as being functionally similar, indicating traits which are psychologically alike.

An inspection of the figures revealed the presence of certain of these functional clusters. The mathematical tests 1, 2, 3, 5 tend to group together; tests 4 and 9 occur somewhat loosely connected, and the three verbal tests 6, 7 and 8 form a constellation. The functional clusters of tests discovered in this way indicate certain functional abilities, and they provide an indication of the most significant positions for locating the axes. The rotation of the axes so that they pass as closely as possible through these clusters therefore provides factors capable of significant psychological interpretation. Since, however, these functional clusters represent only the tests which tend to group together in the case of the girls, it is necessary next to examine the factorial matrix from the boys' results and to see what relationships of a functional kind can be established between the two.

(ii) *Examination of the factorial matrix from the boys' results.*

The first essential difference which emerges from an inspection of Table V is that in this case only three independent factors are necessary in order to account for the correlations, as opposed to four in the previous case.

Factor I is again positively correlated with every test in the battery, but in this case the correlations are generally higher, the lowest being, as before, with test 10. Factor II has, as previously, some positive and some negative correlations, and the tests positively and negatively correlated with this factor are somewhat similar in the two cases. This seems to indicate that, as in the previous case, this factor marks a distinction between the mathematical tests on the one hand and the verbal and spatial tests on the other. The notable loadings of factor II are the loadings

¹ ALEXANDER, W. P.: *Op. cit.*, p. 78.

in tests 1, 2, 3 and 5, which lie between $+ \cdot 283$ and $+ \cdot 371$, and the negative loadings of $- \cdot 321$ and $- \cdot 315$ respectively in tests 6 and 7.

The characteristic of factor III seems to be its negative loadings with all the verbal tests except test 7 and with, in addition, two mathematical tests; the most notable loading of this factor being the positive loading of $\cdot 402$ in test 7.

As before, a diagrammatic representation of the relationships existing among the tests was made, an inspection of which revealed that the four mathematical tests 1, 2, 3 and 5 fall closely together, forming a definite functional cluster, and that another functional cluster is obtained from the spatial and certain verbal tests. In the case of the girls, tests 4, 7 and 9 form one cluster, tests 6 and 8 another in a different quadrant; with the boys tests 4, 7, 8 and 9 form one functional constellation, and tests 8 and 10 another, somewhat loosely connected with it. Another point of interest to the problem of rotation is the fact that whereas with the girls tests 4 and 9 tend to group together, in the case of the boys this characteristic is exhibited by tests 4 and 7.

These facts provide an indication of the positions in which the axes can be located in order to obtain from the statistical factors of Tables IV and V psychological factors of the greatest possible significance.

(iii) *Locating the axes.*

Past studies have indicated the presence of a central intellectual factor, the *g* factor of Spearman—it was therefore decided to try to locate this by fixing the first axis to pass through the best test of *g*. It has been found that with both boys and girls test 2—missing numbers—belongs to a constellation of tests—a functional cluster. This test was found to have a high reliability ($\cdot 944$); it is capable of simple psychological interpretation, and it has been found by Dr. Rogers to be “highly symptomatic of mathematical ability.”¹ It was decided therefore to locate the first axis through test 2.

The loadings of this new factor I for all the tests are recorded in column I of the new factorial matrix in Table VIII.

The next question is the location of the second axis, and here there are distinct alternatives. The groupings of tests 4 and 9 in the case of the girls and of tests 4 and 7 in the case of the boys suggest a spatial factor also operative in some verbal tests; on the other hand, there is equal indication of a factor common to the verbal tests. It was decided to try first to locate the spatial factor, and the second axis was rotated through test 4.

The loadings of this factor II for all the tests are recorded in the second column of Table VIII.

¹ ROGERS, A. L.: *Op. cit.*, p. 85.

It was next decided to locate the third axis in such a way as to obtain some indication as to the existence of the verbal factor which seems to be suggested, and for this purpose, bearing in mind the facts emerging from a consideration of the nature of the functional clusters of tests, the third axis was rotated through test 8.

The loadings of this third factor for all the tests are recorded in the third column of Table VIII.

The previous analysis has revealed that there are only four factors necessary to account for the correlations in the case of the girls. The fourth factor therefore must account for all that is left in the various tests.

The fourth factor loadings are recorded in the fourth column of Table VIII.

TABLE VIII.—THE NEW FACTORS AFTER ROTATION (GIRLS).

	<i>Test.</i>	<i>Rotated factor loadings</i>				<i>h²</i>
		I(<i>g</i>)	II(<i>o</i>)	III(<i>v</i>)	IV (<i>residual</i>)	
1	Arithmetic reasoning ....	.823	.146	— .212	.000	.7433
2	Missing numbers .....	.663	.000	.000	.000	.4395
3	Algebraic computation and reasoning .....	.680	.091	.097	— .162	.5063
4	Spatial .....	.437	.799	.000	.000	.8292
5	Geometry .....	.602	.184	.323	— .287	.5830
6	Selection and rejection ..	.480	.257	.454	— .081	.5090
7	Selection of words in context .....	.056	.225	.368	.434	.3776
8	Analogies .....	.543	.070	.529	.000	.5801
9	Sequences .....	.255	.751	.544	.000	.9249
10	Mixed relations .....	.167	.143	.047	.524	.3254
		I ¹	II ¹	III ¹	IV ¹	<i>Total</i>
	Σh^2	2.754	1.408	1.079	.578	5.819
	$\frac{\Sigma h^2}{n}$	.473	.242	.186	.099	1
	Percentage of total communality	47.3	24.2	18.6	9.9	—
	Percentage of total variance ..	27.54	14.08	10.79	5.78	—

It is now necessary to repeat the procedure using the data implicit in the factorial matrix on the boys as recorded in Table V.

As before, the axis was first rotated through test 2, and the loadings of the new factor I for all the tests are entered in column I of Table IX.

In this case, however, there are only three factors, and the functional clusters seem to suggest that these are spatial and verbal in character. There are therefore two possible methods of locating the second axis—either through test 4 as in the previous case, or through a verbal test, test 8 seeming to be the best one for this purpose. It was decided to try to locate first the spatial factor, and the second axis was accordingly rotated, as in the previous case, through test 4. The loadings of this factor II for all the tests was then calculated and these are recorded in the second column of Table IX.

The third factor now accounts for all that is left in the various tests, and the loadings of Factor III are recorded in the third column of Table IX.

TABLE IX.—THE NEW FACTORS AFTER ROTATION (BOYS).

	Test.	Rotated factor loadings			h^2
		I ¹ (g)	II ¹ (o)	III ¹ (residual)	
1	Arithmetic reasoning . . . .	.774	.052	.118	.6157
2	Missing numbers . . . . .	.657	.000	.000	.4316
3	Algebraic computation and reasoning . . . . .	.666	.159	.425	.6495
4	Spatial . . . . .	.518	.597	.000	.6248
5	Geometry . . . . .	.736	.106	.283	.6331
6	Selection and rejection . .	.094	.492	.339	.3658
7	Selection of words in context . . . . .	.407	.636	— .251	.6329
8	Analogies . . . . .	.410	.543	.300	.5527
9	Sequences . . . . .	.321	.507	.276	.4362
10	Mixed relations . . . . .	.154	.312	.240	.1788
		I ¹	II ¹	III ¹	Total.
Σh^2		2.754	1.691	.676	5.121
$\frac{\Sigma h^2}{n}$		.5378	.3302	.132	1
Percentage of total communality		53.8	33.0	13.2	—
Percentage of total variance . .		27.54	16.91	6.76	—

V.—THE INTERPRETATION OF THE FACTORS.

It is now necessary to examine the factorial matrices of Tables VIII and IX column by column to see what conclusions can be arrived at with regard to the factors which have been isolated.

An inspection of Tables VIII and IX shows that the first factor accounts for 27 per cent. of the total variance in each case (47 per cent. of the total communality in the case of the girls and 53 per cent. in the case of the boys). It is thus obviously the most important factor entering into the tests used. Considering only those tests which have weightings of about .40 or higher, we notice that in both cases the arithmetic reasoning test has the highest saturation of factor I, the loadings for the missing number, algebra and geometry tests also being high. Significant loadings are also obtained in both cases in the spatial and analogies tests, in the case of the girls in the selection and rejection test, and in the case of the boys in the test of selection of words in contexts.

What then is the nature of this first factor common to both girls and boys? The tests most heavily saturated with this factor are the mathematical ones which involve deductive reasoning; the ability to solve problems in arithmetic, to understand and use symbols intelligently and rapidly, to manipulate abstract quantities without concrete aids, to apply general principles to specific cases, and finally "to analyse abstract elements, to generalize from these and further to make application of the principle discovered."¹ It was located by rotating the first axis to pass through test 2—the missing number test—which involves the power to analyse a given situation, to abstract its essential features, to realize its implications and make inferences from them. Such an ability is also called into play in the analogies test, which necessitates the power to perceive the relationship between one word and another and to state that relationship by completing a suggested analogy, whilst the test of the selection and rejection of words designed to test the ability to exclude irrelevant from logically connected data also must necessarily imply it. The loadings of this factor in the spatial tests is also interesting in that the weightings here are not as high as in the mathematical tests named.

It would appear therefore that this is similar to the *g* factor of Spearman and that it is the common factor in mathematical ability. This supports the findings of Rogers², Burt³, Flack⁴, and Mitchell⁵ that in all

¹ ROGERS, A. L.: *Op. cit.*, p. 85.

² ROGERS, A. L.: *Op. cit.* (also *Teachers' Coll. Record*, vol. XIX, No. 4, p. 416.).

³ BURT, CYRIL: "The Development of Reasoning Ability in School Children," *Journ. Exptl. Ped. Training Coll. Record*, vol. V, 1919, pp. 68 *et seq.*

⁴ FLACK, W. S.: *Op. cit.*, p. 201.

⁵ MITCHELL, F. W.: *Op. cit.*

the tests that are mathematical a general common factor is observed. In this study the tests with significant loadings seem to suggest that emphasis should be laid on the reasoning nature of this factor. It is suggested that it is probably best described as the power of selective, quantitative thinking and of deductive reasoning, involving the ability to apply general principles to particular cases in number, symbolic and geometric work, to abstract, generalize, and use the essential features of a given complex situation, and to make deductions from these for the elucidation of other complex situations.

This therefore is the central intellectual factor in the mathematical ability of girls and boys.

A second factor, accounting for 14 per cent. of the total variance in the case of the girls, and 16 per cent. in the case of the boys (24 per cent. and 30 per cent. of the total communality respectively) seems also to be of some importance. The problem now is to discover the nature of this factor, to determine how it can be best described. Turning first to the girls' results—Table VIII—it will be seen that the significant loadings are obtained in the spatial and sequences tests. What do these tests involve? The spatial tests call for the ability to perceive spatial relationships, and involve the carrying in mind of a spatial configuration, its recognition in a new configuration, and the manipulation of geometric figures. The sequences test estimates the ability to perceive a logical order or sequence and the power to manipulate verbal data in such a way as to arrange them in this logical sequence.

This seems to indicate that this factor is spatial and manipulative in character, confined not merely to the manipulation of spatial data but extending also to include the manipulation of verbal data and in which some kind of visual imagery is called into play. It is therefore different from the purely spatial *k* factor of Koussy¹, but provides a definite confirmation of the factor found by Mitchell² in spatial tests, and in three verbal tests of analogy and classification. This he designated *o* and the results of this study provide a vigorous support for his conclusions. Mitchell describes this factor as "an operation in imagery factor in which visual, spatial imagery would appear to play a prominent part."³

It is now necessary to see if the second factor inherent in the mathematical ability of boys is also this *o* factor. An inspection of Table IX indicates its presence in a larger number of verbal tests. In addition to the spatial and sequences tests, significant loadings are obtained in the tests of selection of words in contexts, selection and rejection, and analogies. That

¹ KOUSSY, K. K. : *Op. cit.*

² MITCHELL, F. W. : *Op. cit.*

³ MITCHELL, F. W. : *Op. cit.*, p. 186.

the largest weighting occurs in the selection of words in contexts seems at first sight difficult to explain, since this was the only test which set out to estimate a true feeling for words, and sensitivity to verbal usage. An explanation may be that in choosing the most exact word from the possible alternatives the children tend to visualize other similar sentences which they have read and to select the word that they have seen used in a similar connection. In any case this test proved to have a lower reliability than most of the others in the battery, and more elucidation seems necessary before any real significance can be drawn from the presence of the *o* factor in this particular test. In the case of the analogies test the explanation provides no difficulty, since the test involves a perception of the relationship between one word and another, and the application of the principle discovered. This appears also true for the selection and rejection of words, although this test has a smaller saturation of the *o* factor.

These considerations appear to justify the conclusion that, just as in the case of girls, the second mental factor of importance in the mathematical ability of boys is the factor *o* involving operations in imagery and the manipulation of verbal and spatial data. This factor is distinct from the general common factor *g*, but it will be seen that these two factors together seem to account for the greater part of the performance in most of the tests, a fact which again supports the findings of Mitchell.¹

Turning now to the third factor, and considering first the case of the girls, it will be seen from Table VIII that it accounts for 11 per cent. of the total variance (18 per cent. of the total communality) and that significant projections are obtained in the verbal tests—selection and rejection, selection of words in contexts, analogies and sequences. It seems clear that this is a verbal factor *v*. Its weighting of .323 in geometry seems significant, since in at least one of the three geometry tests, converses, which require the perception of the fundamentals in a given statement and the expression of its converse in a precise form, a factor of verballity would be expected to be involved. Since therefore this factor is linked to the verbal tests, it seems possible to name it with some confidence as far as this particular battery is concerned, and it can be said that the third factor of importance in the mathematical ability of girls is a factor of verballity *v*.

Turning now to Table IX, to the third factor in the mathematical ability of boys, the residual left after the extraction of the first two factors, it will be seen that it accounts for seven per cent. of the total variance (14 per cent. of the total communality). Significant weightings of this factor are obtained in algebra, selection and rejection, analogies, geometry, and sequences tests, whilst the loading in test 7—the selection of words in

¹ MITCHELL, F. W. : *Op. cit.*

contexts—appears to indicate that it is not a pure verbal factor. This seems to suggest that this factor is a factor of verbal reasoning, quite distinct from mathematical reasoning and the central intellective factor *g* which was described as involving deductive reasoning and selective quantitative thinking. Mathematical reasoning, dealing as it does with concepts of a considerable degree of abstractness and complexity, will obviously demand a high level of general intelligence, and this therefore will be included in the common factor *g*. The verbal tests with the largest saturation of this third factor are logical in character, dealing with ideas and the relations between ideas, which seem to suggest that this verbal factor is logical in nature. It would appear to be the ability to manipulate words, ideas, and, because of its significant loading in the algebra tests, symbols too, the ability to grasp relationships between verbal data and to make deductions from them. It is therefore a verbal factor, but distinct from that isolated in the mathematical ability of girls. It is admitted that the existence of this factor is far from conclusive, but to describe it as a verbal reasoning factor, or a factor of “verbal relations,”¹ *w*, involving the power of reasoning with words and ideas, and necessitating a knowledge of the meaning of words, seems the best possible. Distinct from the *v* factor isolated in the case of the girls, it appears to correspond largely with the *w* factor isolated by Thurstone¹, the two factors involving verbal material in psychologically different manners.

It now remains to try to interpret the fourth factor in the mathematical ability of girls. This factor, the residual left when the *g*, *o* and *v* factors have been extracted, accounts for six per cent. of the total variance (ten per cent. of the total communality). The only tests with significant saturations of this factor are the selection of words in contexts, and mixed relations. The problem is therefore to identify if possible the psychological trait which is common to these two tests and absent from the remaining eight tests with negligible saturations of this factor. The saturation of .524 in the mixed relations test represents a quarter of the variance of a test which so far has provided no significant data. It involves the ability to select, in a minimum of time, a correct relationship from several which at first sight seem probable, and serves therefore to distinguish those who can perceive such a relationship immediately from those who, given sufficient time, would perceive it eventually, since the relationships chosen were the simplest that it was possible to evolve. The immediate selection of the correct relationship would appear therefore to depend on an accurate perception of exactly the data given, and its retention in a precise form. At first sight such a test seems to have little in common with a test

¹ THURSTONE, L. L. : *Op. cit.*, p. 84.

involving the selection of words in contexts; but, on going beneath superficial dissimilarities, certain facts of resemblance emerge. In the first place, the selection of words in contexts, a true test of linguistic ability and a feeling for words, appears to necessitate by reason of the actual alternative possibilities in each case, just this factor of exactness and precision implicit in the test of mixed relations. In the examples given it is not a question of excluding words which would give an incorrect meaning to the sentence, but of selecting from several words approximating to the precision required, that which is the most exact in each specific case. It is suggested therefore that this fourth factor is a factor of precision and exactness, and it is proposed to designate it by x .

It will be contended that this factor should be inherent in all the tests, that precision of thought, exactness and clear thinking, necessary for successful performance in all work, would be an essential part of g . That is realized and admitted, but although the evidence permits of no really satisfactory explanation as to the nature of this factor it is suggested that over and above the general factor, including the power of clear, selective thought, there is, in the mathematical ability of girls, a specific factor of precision and exactness which, isolated by the performance of these two tests, appears to be the fourth in importance. Further research bearing on this factor, its actual nature and scope, is necessary to confirm what at the moment can be regarded at the most as an interesting speculation.

VI.—SUMMARY AND CONCLUSIONS.

The results of this study seem to confirm the complex nature of mathematical ability, indicating that in this composite mathematical functioning certain definite factors are involved, and that these intellectual factors are different in boys and girls. In the case of boys, three specific factors, g , o and w , enter into mathematical ability, whilst in the case of girls we have found four mental components, g , o , v and x .

It has been found that the first factor of importance in the mathematical ability of both boys and girls is a common factor which appears to be similar to the g of Spearman. This factor, in both sexes the most important component of mathematical ability, is described as the capacity for selective, quantitative thinking and deductive reasoning, involving the ability to apply general principles to particular cases in number, symbolic and geometric work, and the power to abstract, generalize and use the essential features of a given complex situation and to make deductions from these for the elucidation of other complex situations.

Next in importance comes a factor which has been designated o , an operation in imagery factor, involving the manipulation of spatial and

verbal data. This factor is found to play a relatively larger part in the mathematical ability of boys than of girls, being involved in a greater number of tests of a verbal character.

A difference in the mathematical functioning of the two sexes is shown by the third factors. In the case of girls, a factor of verballity *v* operative in the verbal tests is clearly defined and can be named with confidence. In the case of the boys, however, the actual character of the tests with significant saturations of this factor suggests that in their case verbal material is used in a psychologically different manner. The factor, which has been named *w*, is not a purely verbal, but rather a verbal reasoning factor, which, from this study, appears to involve the power to manipulate ideas in a verbal form, to wield words, to classify them and to make deductions from them. The precise significance of this difference in mental functioning for the teaching of mathematics to boys and girls is not immediately obvious. It does seem to suggest, however, that oral work, involving the following out of the logical steps of an argument, can be more easily performed by boys than by girls, that from the former therefore more satisfactory results will be obtained in work presented in this manner. Not only are they endowed with a relatively higher proportion of the factor *o* involving the manipulation of data, whether verbal or spatial, but in addition the verbal ability appears to operate on the reasoning plane. In the case of the girls, it would appear that in written work, involving the actual statements of the stages of an argument, the statement of data for example involved in problem work in algebra, arithmetic, and geometry, a greater proficiency would be obtained than in the oral performance of an identical task.

Finally in the case of the girls, a fourth factor is suggested to operate in mathematical ability. The evidence for this is not conclusive, but it is tentatively suggested that this is a factor of precision and exactness best described as the ability to retain data in an exact form, and to discriminate between relatively and precisely exact data.

It is realized that these findings, based on an analysis of the results of 100 boys and 100 girls in the given age range, cannot be regarded as conclusive. This study claims only to provide a foundation, an indication of the existence of possible factors, to be further elucidated by a more specialized investigation from which it is hoped to be able to offer not tentative suggestions but conclusive results, not interesting speculations but scientific facts, and so to provide psychologically some definite elucidation of the intellectual components of the mathematical ability of boys and girls.

SOCIAL BEHAVIOUR RATING SCALES FOR ELEMENTARY SCHOOL CHILDREN.

BY K. M. B. BRIDGES.

THE two social behaviour rating scales here presented were devised for the purpose of measuring the social maladjustment and the progress in social adjustment of elementary school children between the ages of six and fourteen years. They may be rated by teachers, school psychologists and social workers attached to child guidance clinics. One scale refers to behaviour in school, the other to behaviour out of school. Repeated ratings at intervals of six months or more may be made to show progress or other changes in behaviour.

Average scores obtained by certain groups of Leicester school children are given below for purposes of comparison. The scales have the disadvantages common to all rating scales, particularly as regards the effect of subjective bias on the part of different raters. The results obtained in Leicester, however, indicate that differences of twenty points or more in children's scores may be regarded as significant. (The difference between the average scores of ordinary class children and those known to be behaviour problems is twenty points. The standard error of the estimate for a raw score is ± 7.7) Since local conditions are bound to have some influence on rating scores, it would be desirable for all users of the scales to obtain group scores for comparison from their particular locality.

SOCIAL BEHAVIOUR RATING SCORES.

<i>School Group.</i>	<i>No. of Pupils.</i>	<i>Av. Age.</i>	<i>Av. I.Q.</i>	<i>Av. Sch. Score.</i>	<i>Mean Dev'n School.</i>	<i>Av. Home Score.</i>	<i>Mean Dev'n Home.</i>
Elementary School Ordinary Classes..	280	10.9	105 (Otis)	85	10.4	—	—
Elementary School Special Classes for dull children	624	10.0	70 (Cattell)	82	11.1	—	—
Difficult behaviour problems in Elementary Experimental School	51	11.0	94 (Cattell)	65	16.0	61	15.9
Special school children all M.D. and difficult	65	12.10	55 (Cattell)	56	16.9	52	16.7

SOCIAL BEHAVIOUR SCALE.

Date

(SCHOOL).

Name Date of Birth

Address Age

School Rater's Name

Class

DIRECTIONS.

This rating scale refers to the child's behaviour in school during the last six months, and should be marked by the teacher or the psychologist after consultation with the teacher.

Mark (2) for each statement which applies correctly, and (0) for each item which does not apply correctly to the child under consideration. Mark (1) if the statement only partly or sometimes applies, and in all cases of doubt. Do not miss any item.

Multiply the total score by $\frac{3}{2}$ to obtain the final score for each child.

Score.

- 1 Plays amicably with other children without mischief making.
- 2 Does not hold aloof or prefer to play alone.
- 3 Co-operates agreeably in school or class activities.
- 4 Is not easily led into breaking rules or naughty pranks.
- 5 Plays fair and follows rules at games.
- 6 Tries to keep order and control unruly playmates.
- 7 Does not lead others into trouble or mischief.
- 8 Does not disturb and interfere with others.
- 9 Is considerate and helpful to other children.
- 10 Is not noisy or talkative, demanding attention in class.
- 11 Does not fidget or get out of seat in class.
- 12 Does not steal money.
- 13 Seldom disobeys orders and is not defiant.
- 14 Is not insolent to teachers.
- 15 Is not surly or resentful when corrected.
- 16 Is gentle and not rough with smaller children.
- 17 Does not try to dominate others.
- 18 Does not act violently in temper when crossed or thwarted.
- 19 Does not quarrel or start fights.
- 20 Does not allow himself to be bullied or put upon.
- 21 Is not cruel to animals.
- 22 Does not steal objects other than money.
- 23 Does not cheat in lessons.
- 24 Does not tell tales of others to get them into trouble.

- 25 Does not tell boastful lies or fanciful " stories."
 26 Does not play truant.
 27 Does not come late to school.
 28 Does not cry easily or cease effort in face of difficulty.
 29 Is not destructive of school property.
 30 Usually works with diligence.
 31 Usually does clean and tidy work.
 32 Does not show undesirable sex behaviour.
 33 Does not tell evasive lies or try to deceive.

 Total.

Final Score.

Decile Rank

Comments :

SOCIAL BEHAVIOUR SCALE.

Date.....

(HOME).

Name *Date of Birth*

Address *Age*

..... *Rater's Name*

School.....

DIRECTIONS.

This rating scale refers to the child's behaviour out of school during the last six months, and should be marked by the Social Worker or the Psychologist after consultation with parents or guardians and teachers.

Mark (2) for each statement which applies correctly, and (0) for each item which does not apply correctly to the child under consideration. Mark (1) if the statement only partly or sometimes applies, and in all cases of doubt. Do not miss any item.

Multiply the total score by 2 to obtain the final score for each child.

Score.

- 1 Is helpful to parents or guardians in little duties or services.
 2 Is considerate and helpful to other children at home.
 3 Is usually obedient to adult authority.
 4 Is not surly and resentful when corrected.
 5 Is not timid and speechless or cowed with adults.
 6 Does not tell boastful lies or fanciful " stories."

- 7 Does not tell lies to avoid blame.
 8 Is trustworthy, not deceitful.
 9 Does not wander away from home.
 10 Does not stay out late in the evening when told not to do.
 11 Does not show undesirable sex behaviour.
 12 Does not take other people's property.
 13 Plays amicably with other children.
 14 Does not start quarrels or fights.
 15 Does not tell tales of others to get them into trouble.
 16 Is not rough with playmates.
 17 Is not destructive with toys, clothes or household property.
 18 Is clean and tidy in habits.
 19 Does not act violently in temper when crossed or thwarted.
 20 Is not cruel to animals.
 21 Can be trusted to take charge of little ones.
 22 Is not afraid to be left alone or parted from guardian.
 23 Does not cry easily or give up in face of difficulty.
 24 Finds occupations for self.
 25 Is generally cheerful and happy.

Total.

Final Score.

Decile Rank

Comments :

THE RELATION OF READING DISABILITY TO HANDEDNESS AND CERTAIN OCULAR FACTORS

BY FRED J. SCHONELL
(*Goldsmiths' College, University of London*).

PART I.

- I.—*The problem.*
- II.—*Testees and tests.*
- III.—*Visual perception of backward readers.*
- IV.—*Theories of reading disability.*
- V.—*Relationship of certain perceptual errors to handedness.*
- VI.—*Evidence from the present investigation.*

I.—THE PROBLEM.

THE study herein reported formed part of a wider investigation into disability in reading with a full consideration of diagnostic tests, mental and physical factors in reading retardation, and the appropriate remedial measures, general and specific, for different types of backward readers.¹ During the wider investigation one of the most interesting problems examined was the relationship between handedness and certain ocular characteristics of the pupils and their reading disabilities. Both the complexity of the problem and its connection with theories of reading disability attracted attention. Although details are given later, it seems advisable at this point to explain the terms of reference in the study. For the most part the cases of *reading disability* were normally intelligent pupils (I.Q.'s 85 and above, except for a small selected group with I.Q.'s 70-84), whose reading ages were at least $1\frac{1}{2}$ years below their mental ages for general intelligence. *Handedness* referred to the hand preferred by the pupils in manual operations as determined by tests of writing, winding, throwing, cutting, hammering, sorting and stirring.

Ocular characteristics referred to the preference of one eye in sighting. It is now generally admitted that children and adults favour one eye in sighting as they favour one hand in many manual operations. This ocular dominance can be fairly accurately determined by tests.

¹ In the press, *Backwardness in the Basic Subjects*, Fred J. Schonell, Oliver and Boyd. This deals with the diagnosis, causation and treatment of disability in reading, spelling and English (oral and written).

The six combinations of handedness (as shown by tests) and eyedness, namely, R.R. ; L.L. ; R.L. ; L.R. ; Right-handed, sighting with either eye ; Left-handed, sighting with either eye, and their relation to disability in reading were investigated.

Finally, the allied combination of left-handedness and strabismus (squint) was the only consideration of handedness with a structural visual deficiency admitted to this section of the study.

II.—TESTEES AND TESTS.

The data for the investigation was gathered from 104 backward readers whose chronological ages and I.Q.'s are given in the tables below :

TABLE I.
CHRONOLOGICAL AGES OF 104 BACKWARD READERS.

C.A.	7+	8+	9+	10+	11+	12+	13+
No.	15	14	21	19	17	8	10

TABLE II.
I.Q.'s OF BACKWARD READERS (BURT-TERMAN REVISION OF BINET).

I.Q. Range	70-79	80-89	90-99	100-109	110-119	120-129	130-139
No.	3	26	41	19	10	3	1

With all pupils, complete information was gathered by means of the following case study schedule :

- (1) Measurement of general intelligence (Burt-Terman Revision. Results above).
- (2) Application of scholastic tests (reading, arithmetic, spelling, composition, art, handwork,¹ general knowledge).
- (3) Application of diagnostic tests of reading².
- (4) Application of sensory tests.
- (5) Assessment of emotional characteristics.

¹ Taken mainly from Dr. BURT's *Mental and Scholastic Tests* (P. S. King and Son).

² Compiled for the investigation. See *Backwardness in the Basic Subjects*.

- (6) Recording of interests.
- (7) Brief enquiry into personal history.
- (8) Educational history in reading.
- (9) Talk with the pupil concerning attitudes towards the disability.
- (10) Enquiry into possible anxieties or conflicts.

The reading tests included :

- (a) Burt's Graded Word Test.¹
- (b) A simple prose test of three paragraphs of increasing difficulty ("My Dog")² which gave an estimate of word recognition in continuous material, and also a measure of comprehension from the questions answered after the reading.
- (c) A 'Regular' Word Test. This contains everyday regular combinations of vowels and consonants, together with the common vowel and consonant digraphs, such as 'ee,' 'ai,' 'oo,' 'ie,' 'ea'; 'ck,' 'st,' 'sp,' 'th.'

The first 25 words of the test are as follows :

win	had	boy	will	from
mud	sing	keep	get	rod
dug	yes	fish	nip	gum
mop	her	sold	let	say
clock	van	train	dress	stick

The test gives a measure of the pupil's ability to analyse and synthesize common phonic units.

- (d) A Test of Reversals of Letters and Words. Groups of four words are read downwards to obtain an estimate of the reversal and confusion tendency. These represent samples of the material :

bed	pot	of	on
dig	pit	for	to
bad	top	from	dog
boy	got	ton	no

¹ *Mental and Scholastic Tests*, or printed separately in *A Handbook of Tests*. (P. S. King and Son.)

One can also use Vernon's recent, excellent revision and extension of Burt's Scale, *The Standardisation of a Graded Word Reading Test*: P. E. VERNON. (University of London Press.)

² Copies of the complete tests, instructions, norms and interpretation of (b), (c), (d), (e) are given in *Backwardness in the Basic Subjects*. (Oliver and Boyd.)

- (c) A Visual Word Discrimination Test completes the battery of reading tests. This test was constructed from 25 selected words each of which was likely to cause, with different readers, different errors. The correct form of each word was accompanied by five incorrect forms, namely, forms with an omission of a letter, an addition of a letter, or transposition of one or more letters and a substitution of a vowel or a consonant ;

e.g.,	1.	put	purt	pot	pul	pt	top
	6.	thre,	thrie	there	three	these	theree
	7.	babies	babees	babes	babeis	babiese	badies

The testee was shown the correct form of the word, printed separately on a card, for five seconds, after which he had to indicate from the six forms on the printed sheet which one he had seen. Additional trials with the words were given where necessary.

III.—VISUAL PERCEPTION OF BACKWARD READERS.

Weakness in discriminating between visual patterns of words, particularly those of similar structure, is one of the commonest characteristics of backward readers. No less than 44 per cent of the boys and 40 per cent of the girls in the group showed this weakness in a pronounced form. These pupils could not react accurately to the whole pattern of the word, nor differentiate patterns one from the other. They would confuse the minor structural differences that existed between 'for' and 'from'; 'three' and 'these'; 'who' and 'how'; 'shop' and 'stop.' They were likely to replace one form by the other in reading; usually the better known one was most used, but not always with consistency. In many instances they would take parts of the word and then try to guess the whole word, for example, 'fr' would attract them and words such as 'farm,' 'front,' 'for,' 'from,' 'form,' could easily all be read as 'for' or 'from.' These backward readers reacted to particular letters or groups of letters in a word rather than to its configuration plus guidance from these particular letters.

(b) Related to their inability to discriminate between visual patterns of words is the weakness of some pupils in perceiving the orientation and letter sequence of words. This is shown in the tendency to reverse small words, to confuse letters which differ only in left to right position of particular groups and to transpose letters and syllables in reading words. The weakness is connected with the pupil's inability to make a correct

consistent perceptual attack on words. Instead of proceeding systematically from left to right in every word, he exhibits a form of right to left perception. Sometimes he commences in the middle of the word and works to either the left or the right according to the familiarity of the remaining groups of letters; at other times he works from the extreme left of the word to the right, thus the characteristic errors of backward readers displaying this perceptual weakness are:

- (i) confusion of 'b,' 'd'; 'p,' 'q.'
- (ii) reversal of words such as 'was,' 'saw'; 'on,' 'no'; 'of,' 'for'; 'pot,' 'top.'
- (iii) transposition of letters such as 'gril' (girl); 'theer' (three); 'ram' (arm)

Error (iii) is commoner in writing than in reading, particularly with words like said (siad), again (agian), foreign (foreing).

Of the 104 backward readers under consideration, the deficiencies in visual perception of a few of them were due to uncorrected defects of eyesight¹, or to past habits set up during a visual defect now corrected, but continuing to be of contributory importance. But there were many who, while not revealing any apparent defects of visual acuity, nor any pronounced weakness in auditory analysis and synthesis, were yet defective in the ability to perceive differences in patterns of words and/or the orientation of the letters in these patterns. To what could their weakness be ascribed?

IV.—THEORIES OF READING DISABILITY.

Various theories have been advanced to account for this deficiency, some favouring an inherited or congenital basis, others explaining it in terms of acquired attitudes. One of the earliest of the former type is Hinshelwood's² "congenital word blindness" interpretation. He believed that in backward readers there was defective cerebral development in localized areas connected with perception of words. For severe cases he suggested the term "congenital word blindness," and for mild cases "congenital alexia."

Later Pick postulated a theory of delayed cerebral development. Recent research does not, however, provide evidence of such localized

¹ The actual percentages of visual defect for the group of backward readers in myopia, astigmatism, and hypermetropia (over and above that normally present in young children) or combinations of these three structural defects were: slight defects, 7 per cent; marked, 15 per cent; as compared with a control group, slight 6.5 per cent; marked, 9 per cent.

² HINSHELWOOD, J.: *Congenital Word Blindness*. (H. K. Lewis and Co., London, 1917.)

cerebral functioning for higher mental processes.¹ Lashley's² experiments show that the brain tends, with regard to intellectual powers, to function as a unit and that it is the organization of functions rather than the functions of a particular area that is upset by lesions, shocks and toxins.

In general, neither histological studies nor remedial work with backward readers tends to support an inborn cerebral deficiency theory of backwardness in reading. Frank³ suggests that immaturity of perception is the cause of disability in reading, for in comparing errors made by backward readers of 7 to 11½ years she finds marked similarity with those made by younger children of 5 to 7 years who are just learning to read. Both in reading and in spelling the confusion of words of similar structure and the confusion of letters of similar structure indicate that the older backward reader is still at the perceptual level of the younger beginner whose tendency is to perceive in wholes of structural solidity without necessarily having the analytic power to discriminate between the finer intrinsic differences of similarly constructed wholes.

V.—RELATIONSHIP OF CERTAIN PERCEPTUAL ERRORS TO HANDEDNESS.

Relying largely upon the evidence offered by confusion of 'b,' 'd' reversals of words and transposition of letters, some writers have been tempted to relate reading disabilities to left-handedness. Thus Dearborn, presenting data concerning backward readers, stated that one-third of the cases (25) were left-handers, and cited reversals of words, confusion and transposition of letters as "commonly observed errors."

Recent research does not substantiate any vital connection between left-handedness as such and reading disability. Thus Moody and Phillips,⁴ in comparing 136 pairs of right and left-handed pupils, matched according to sex, chronological age, mental ability, reading ability and grade placement, with five different reversal tests, concluded that in this battery of tests involving reading or activities closely related to the mental reaction in the act of reading, handedness, *per se*, with the two groups under consideration had little or no influence on the type of reading responses made.

¹ See Dr. BURT's review of the evidence against so-called centres (pp. 326-333 *The Backward Child*) in discussing the problem in relation to stammering and left-handedness, especially his consideration of the popular idea that interference or changing the left-hander may produce stammering, due to a misconception based on the proximity of handedness and speech centres in the brain.

² LASHLEY, K. S.: *Brain Mechanisms and Intelligence*. (Chicago: University of Chicago, 1929.) "Basic Neural Mechanisms in Behaviour," *Psy. Review* XXXVII, Jan., 1930.

³ FRANK, H.: "A Comparative Study of Children who are Backward in Reading and Beginners in the Infant School." This *Journal*, V, Part I, Feb., 1935.

⁴ MOODY, C., and PHILLIPS, A. J.: "The Effects of Handedness on Reversals in Reading," *J. of Educ. Research*, May, 1934, pp. 651-660.

Left-handed pupils reacted to the various reading situations just as right-handed pupils did. The investigators note that, as far as possible, only pure right-handers and pure left-handers took part in the experiment and that different results might have been obtained from cases where neither right nor left-handedness was dominant.

It is on this basis of mixed handedness and eyedness that Orton¹ formulated his theory of reading disability which he suggested was due to failure to train the brain to work exclusively from the leading or dominant hemisphere. He says that there are three different levels of cerebral functioning with regard to the perception and understanding of words. The first level relates to the ability to perceive visual stimuli and to register those perceptions. The second relates to the recognition of objects and is bilateral, like the first. These lower centres, as he calls them, are similar areas of the two hemispheres apparently functioning together as a unit (for destruction of both areas is necessary for cortical blindness). At the third level, the visual associative, the visual element is linked with data from other sensory fields (sound and movement) and only one hemisphere is operative. It is by means of the associative tracts in this area that words are understood.

He suggests that engrams are formed in the associative tracts of both hemispheres, but that they are latent, or elided, from one hemisphere (the non-dominant). The establishment of dominance of the hemisphere for speech and writing, according to Orton, occurs in early childhood, "but apparently at varying ages and expresses itself outwardly in a preference for the right or left hand as the case may be."

If clear cut dominance is not established, says Orton, engrams from one hemisphere might interfere with the linkage between 'the sensory stimulus' (the printed word) and its meaning, and hence there might be difficulty in recognizing letters and words in their correct orientation.² Evidence of this lack of dominance, argues Orton, is to be found in the backward reader's confusion of letters of the same form ('b,' 'd': 'p,'

¹ First formulated after a study of 15 cases of reading disability. ORTON, S. T. "Word Blindness in School Children," *Arch. of Neu. and Psychiatry*, 1925. Vol. XIV, pp. 581-615.

Genetic Psy. Monographs, Vol. VI, Nos. 4 and 5, 1928 (pp. 335-339).

Foreword to *Methods for Diagnosis and Treatment of Cases of Reading Disability*, by MARION MUNROE.

ORTON, S. T.: "The Sight Reading Method of Teaching Reading as a Source of Reading Disability," *J. of Educ. Psy.*, Feb., 1929.

² Dr. Creak interprets this part of Orton's theory in this way, "He suggests that visual memory patterns or engrams are formed in both hemispheres, those in the dominant hemisphere being the ordinary right-handed form of the written word, and those in the so-called silent hemisphere being the mirror image, thus CAT and TAC, and that the brain learns to suppress the mirror image." CREAK, MILDRED, M.D.: "Reading Difficulties in Children," p. 146, *Archives of Diseases in Childhood*, June, 1936.

'q'), the tendency to read from right to left instead of from left to right, and the facility which some of the backward readers showed in mirror reading and mirror writing.

VI.—EVIDENCE FROM THE PRESENT INVESTIGATION.

Evidence in favour of Orton's theory is supposed to be the confusion of similar letters, and reversals or part reversals of words shown by backward readers. We may well ask from the outset, "What is the extent of these types of errors amongst all backward readers and amongst normal readers at different ages?" and "What is the significance of the error in the total reading disability of the pupils?"

On these points information was gathered from the group of 104 backward readers between the ages of 7+ and 13+, and from 104 normal pupils of similar ages. The control group included a few pupils of 7+ in the infant classes and the entire sample contained a correct proportion, namely 10 per cent, of dull pupils. Tests of oral reading (words and prose), of spelling (words and prose), and of composition were given to both groups. Any confusion of 'b,' 'd'; 'p,' 'q'; 'w,' 'm'; was noted, while transposition of letters within words both in reading and writing were accepted as indications of this perceptual weakness. No attempt was made to relate the distribution of the errors to handedness and eyedness; there were various combinations of handedness and eyedness in both groups. We were simply concerned at this stage with the incidence of the errors at various age levels amongst backward and normal pupils. The figures obtained are given in Table III.

It will be observed that in spite of the smallness of the samples, there is significant evidence that in all age groups there are many more backward readers than normal pupils who are subject to these perceptual errors.¹ It can also be inferred from the figures that, amongst backward readers after the age of 9+, these types of error decrease fairly rapidly with increase in age, but prior to that age the error is widespread.

¹ These figures should be of vital interest to all teachers, for one of the most frequent questions asked of the educational psychologist by teachers concerns pupils who confuse 'b,' 'd'; 'p,' 'q'; and/or who reverse short words. It should be remembered that most young children between the ages of 5+ and 7+ have difficulty (decreasing with age) in remembering the correct orientation of patterns and parts of patterns (letters, words or figures). It is because the thing perceived has for them structural solidity and they tend to neglect its spatial setting. As the patterns partake of full meaning through usage and experience, and as the pupils mature mentally, so the tendency to use or view patterns in reversed or even inverted position tends to disappear. With pupils up to the age of 7, teachers should not be perturbed over reversed 7's or 3's, or confused b's and d's. After that age the error indicates a perceptual weakness which may be due either to an organic visual deficiency or to a purely mental weakness in this specific realm of printed symbols.

TABLE III.
 PERCENTAGES OF BACKWARD READERS AND NORMAL PUPILS SHOWING CONFUSION AND TRANSPOSITION
 OF LETTERS AND REVERSALS OF WORDS IN READING AND WRITING.

Age.	No.	Reading.				Reading and/or Writing.				Writing.			
		Confusion of letters <i>b, d; p, q; w, m.</i>				Transposition of letters and reversals of words.				Confusion of letters <i>b, d; p, q; m, n; w, m.</i>			
		Bud. Readers.		Controls.		Bud. Readers.		Controls.		Bud. Readers.		Controls.	
		B.	G.	B.	G.	B.	G.	B.	G.	B.	G.	B.	G.
7+	15	85	100	30	25	85	100	35	27	60	100	15	10
8+	14	60	60	15	10	80	60	21	18	60	80	8	6
9+	21	82	60	5	5	82	60	15	16	82	72	—	—
10+	19	30	25	—	—	60	50	12	12	50	75	—	—
11+	17	14	—	—	—	45	30	5	5	30	6	—	—
12+	8	15	—	—	—	32	—	—	—	18	—	—	—
13+	10	—	—	—	—	22	—	—	—	20	—	—	—

In this respect it should be noted that the figures do not take into consideration the amount of error made by the backward readers compared with normal readers, but an examination of the records kept during the experiment shows a much greater number of errors amongst the backward readers. Some of the normal pupils included in the results made only one or two transpositions while a few made only a single reversal, but the fact that they still showed this weakness in their perception of words was sufficient evidence to include them in the lists irrespective of extent of errors.

A third point, evident from the figures of Table III, is that there are some backward readers (including seven-year-olds) who are entirely free, both in reading and writing, from confusion of 'b,' 'd'; 'p,' 'q'; etc., or transposition of letters, or from reversal of short words. This seems to indicate that even if Orton's theory were sound physiologically it must only apply to certain backward readers.

In determining the importance of such errors in the total pattern, the nature of the reading material must be kept in mind, for the number of confusions, transpositions and reversals is much dependent upon the material. The single unit—the letter or the syllable—is most confused, thus 'saw' is more likely to be confused than 'sawing,' 'up' and 'on' than 'upon,' so that if the reading material is of the old phonetic or semi-phonetic kind, loaded with a plentiful sprinkling of forms such as 'bad,' 'dad,' 'day,' 'pig,' 'on,' 'pot,' 'top,' 'was,' 'saw,' 'of,' 'for,' 'up,' then such errors are likely to be more widespread and to continue longer. Where these short reversible words are not introduced too frequently into the reading matter and where they are attached in context to longer contrasting word patterns the backward reader does not find such difficulty in discrimination.

Finally, the figures of the table are significant in that the errors of reversal are much less frequent in writing than in reading. The child who reverses words in reading does not necessarily do so in writing, a fact which demonstrates the value of the manual cue and the kinæsthetic impression in learning words.

We may conclude that with ordinary reading material suited to the child's age, the transposition and reversal type of error is much commoner amongst backward readers than amongst normal pupils, that it indicates the nature of their inaccurate visual perception and suggests lines along which they can be helped, but that viewed against total reading deficiency this type of error does not, for most pupils, assume a rôle of great importance. Although there is a relationship between transposition, confusion

of certain letters and reversals made, and reading success, this is by no means absolute ; some of the worst readers made no such errors, while some quite good readers made errors of this type.¹ There are only a few cases amongst the backward readers for whom the error is intense and extensive and for whom it represents a definite diagnostic symptom of their faulty perception.

(Part II of this article will appear in the next number.)

¹ For supplementary evidence see HILDRETH, H.: "Reversals in Reading and Writing," *J. of Ed. Psy.*, Vol. XXV, Jan., 1934, No. 1.

AN ANALYSIS OF PERFORMANCE TEST SCORES OF A REPRESENTATIVE GROUP OF SCOTTISH CHILDREN.

By GODFREY H. THOMSON. (London : University of London Press,
Ltd., pp. x+58. 5s. net.)

IN the *Factorial Analysis of Human Ability*, Professor Thomson has given us what is unquestionably the clearest, soundest, and most comprehensive account of the mathematical theory of factor-analysis. He tells us he was originally led to these abstract inquiries by his desire to improve the methods of testing and selecting pupils for schools of different types. In his latest work he now applies mathematical theory to concrete data, and shows how the results obtained bear directly on problems of testing and selection. Thus, though primarily statistical, his new volume is of direct importance to the teacher and educational administrator.

How often has the teacher been assured that "recent methods of factor-analysis have now disproved the notion of any such 'general factor' as intelligence?" Yet here is Professor Thomson, himself one of the sternest critics of such notions, taking the very method of analysis least favourable to such a factor, and finding himself eventually forced to recognize its virtual necessity. How often, too, have we been told that "a factor like intelligence cannot be treated as a mere average?" Yet here we learn to our comfort, that simple averaging gives almost as good a measure of what we want to test as the most elaborate devices of weighting furnished by a long and formal statistical computation. Once again, the teacher has been repeatedly warned that Binet is now out-of-date, and that nothing but non-verbal tests requiring special apparatus will give a safe and unbiassed estimate of his pupils' general ability. Yet here it is demonstrated that non-verbal tests and the Binet I.Q. are in remarkably close agreement. Finally, if any one doubts Professor Thomson's conclusions or distrusts his statistical methods, here are the needful figures conveniently tabulated in full; and the critic can apply to them any procedure he pleases.

The volume itself is the sixteenth publication of the Scottish Research Council in Education; and is in fact a sequel to Dr. MacMeeken's report on *The Intelligence of a Representative Group of Scottish Children*. Dr. MacMeeken's survey described the results of testing a typical sample of nearly a thousand children, all those born in Scotland on certain days of a certain year. Professor Thomson's task has been to analyse the extensive data thus collected by the most up-to-date statistical methods.

His first problem is to determine whether there is any significant agreement between the intelligence quotients as obtained by the Binet tests and the assessments reached by alternative methods of testing—for example, by tests of a non-verbal or 'performance' type. Of the non-verbal tests applied by Dr. MacMeeken, 'Cube Construction,' he finds, is the most effective, and yields a correlation with Binet of over .5; if Healy's Picture Completion and Kohs' Block Designs are included, the correlation rises to nearly .7. On adding the six remaining performance tests, little further improvement is secured. "For all practical purposes the straight sum of the raw scores for the three tests (just mentioned) is as good as the weighted sum of all nine tests for correlating with the Binet I.Q."

At the same time he notes that "the assumption of normal distribution does not appear on the whole to be justified; the use of correlation coefficients is therefore to a certain extent invalidated." Accordingly, an alternative check is attempted by the 'analysis of variance.' The main conclusion is still the same: "the regression of Binet I.Q. on the Performance tests is highly significant." Incidentally, here is yet another concrete reply to those who have recently argued that the 'analysis of variance' is not only unnecessary, but actually impossible, with psychological data.

However, as Thomson goes on to point out, the performance tests were not included merely as "good predictors of a Binet I.Q.: on the contrary, . . . they were intended to measure 'a certain practical ability little reached by the Binet test with its linguistic bias'." The whole scheme of testing, indeed, was carefully planned "to measure mental capacity in as many different aspects as possible." Now, as every student knows, these excellent intentions beg an important theoretical issue on which psychologists are still divided. Spearman and his school continue to insist that our pupils' performances in all such tests are primarily due to a single common factor ('*g*'), dominating every test we use; Thurstone, on the other hand, and many who now follow him, prefer to explain the results of a *number* of common factors, each entering into a different group of tests and none entering into all. And there is yet a third possibility which some of us have advocated, namely, that practically all existing cognitive tests measure a composite, including *both* a general intellectual factor *and* one or more subsidiary group factors.

To test Dr. MacMeeken's assumptions, Professor Thomson has undertaken a factor-analysis of her battery of tests. Thurstone's procedure is adopted; and the correlations and the factor loadings so obtained are tabulated and fully discussed. A study of "boundary conditions" at

once reveals (we are told) that "the attainment of Thurstone's 'simple structure'" (i.e., a factor-pattern in which, amongst other conditions, there can be no 'general factor' with positive saturations in *every* test) "is not possible with this battery, even if it were desired."¹

In Thurstone's procedure, however, as ordinarily applied, there are two questionable steps: first, the highest correlation in each column is inserted in the self-correlation cell in place of the unknown communality; secondly, the factor-saturations immediately obtained are rotated graphically to secure as many zero saturations and as few negative saturations as possible. But those of us who have doubted the validity of these two steps are tempted to inquire what conclusions would be reached if these somewhat dubious devices were omitted. Accordingly, before the educationist can accept Thomson's own conclusions, it seems important to meet these possible objections.

(1) With the method of 'simple summation'—the 'centroid' method as Thurstone terms it—certain relations between the factor-saturations should in general appear, which are obscured or distorted when the highest coefficients, observed or residual, are repeatedly inserted in the leading diagonal. To demonstrate this, let us suppose that the true initial coefficients, whether intercorrelations or communalities, are those that may be deduced from Thomson's own table of factor-loadings (Table VIII, Girls). On re-analysing this reconstructed matrix, we obtain the factor pattern shown in Table I (A) below. (i) There is first a large *general* factor, common to the Binet and the Performance tests, which none of Thomson's rotations succeed in abolishing. And the best estimate of this general factor, we observe, is that furnished by the Binet tests. (ii) There is next a bipolar factor that divides the ten tests into two main groups: (a) a group largely dependent upon *speed*, namely, the Seguin, Stutsman, and Manikin Times, and (correlated with these) the Manikin Scores; (b) a second group depending, it would seem, rather upon *quality* of performance than upon amount performed in a given time. (iii) There is another 'factor' which is (as I have called it) 'doubly bipolar': it sub-divides *each* of the previous groups into two contrasted halves. As will be seen from the table (col. *iii* and totals), *the factor-loadings for each group taken separately add up to zero*. This result is inevitable if, as I hold, the simple summation or 'centroid' method treats each successive factor as an average and the next factor as averages of the deviations about the preceding average. But when, with Thurstone, we substitute the highest correlation for the communality, the result may be entirely masked. In consequence most factorists mistakenly treat these

¹ I should prefer to state the matter a little differently. The essential question is not, can we or can we not abolish a general factor of the Spearman type, but what is its relative importance, as judged by its contribution to the total variance. If we measure what may be called the 'hierarchical tendency' by the ratio of the contribution of the first factor to the total communality, then in both Thomson's tables this ratio rises to over 80 per cent. Indeed, the amounts contributed by the second and subsequent factors are here exceptionally small.

doubly bipolar factors as representing a single principle of classification. Here, for instance, Thomson's second rotation attributes all seven minus loadings to one and the same group factor; his first reduces all seven virtually to zero. This is rather like dividing animals into two-legged and not-two-legged, and then assuming that because the two-legged can be sub-divided into winged and not-winged, therefore the legless and the four-legged can be sub-divided into winged and not-winged. (iv) The last factor is quadruply bipolar; it splits each of the four sub-groups into two (so far as that is possible): and again the positive and negative saturations should exactly balance, but in Thomson's table do not. In this case the grouping would seem to be roughly equivalent to re-classifying the tests according to the presence or absence of certain appreciable 'specific factors,' each characteristic of a single test.¹

TABLE I.

Test.	Description.	Factor Saturations. (A) General Factor Method.						Factor Saturations. (B) Group Factor Method.				
		(i).	(ii).	Totals.	(iii).	Totals.	(iv).	Totals.	(i).	(ii).	(iii).	(iv).
6	Binet I.Q. ....	.757	-.186	-1.052	-.065	-.492	-.095	-.205	.780	—	.183	—
8	Knox Cube ....	.432	-.158		-.218		-.046		.364	—	.307	—
8	Kohs Blocks ....	.640	-.265		-.116		-.064		.604	—	.264	—
7	Cube Construction	.718	-.179		-.093		.205	.205	.711	—	.181	—
5	Healy Picture ..	.580	-.090	1.052	.252	.492	.192	.192	.587	—	—	.223
4	Red Riding Hood Picture .....	.637	-.174		.240		-.192	-.192	.652	—	—	.223
2	Manikin (Times) .	.439	.291		-.110		.195	.195	.355	.314	—	—
1	Seguin Formboard (Times) .....	.561	.270		-.017	-.160	-.125	-.195	.489	.315	—	—
9	Manikin (Scores)	.609	.296	1.052	-.033	-.160	-.070	-.000	.538	.343	—	—
3	Stutsman Picture (Times)592	.195		.160		.160	.000	.000	.547	.262	—

¹ It is true that these corrections of the communalities do not seem to alter the figures considerably (cf. Thomson's own note, p. 37). But not every critic of the Thurstone procedure holds, as I do, that the different methods of factor-analysis are but different ways of approximating to the same final result. There is one practical advantage in the method I have advocated: the fact that the separate parts of each factor add up to zero provides a useful check on the working and a very convenient test for the mathematical plausibility of the figures offered by the research student for his later factors. In passing, it is interesting to note that the correlations between Thomson's communalities and the coefficients of variation for the several tests appear to be positive for both boys and girls—thus bearing out (so far as the data go) what I have called the 'complexity theory' of the general factor.

(2) Following Thurstone once again, Thomson proceeds to rotate the primary results with a view to eliminating the negative saturations and maximizing the number of zero saturations. This raises further difficulties. (a) First, as I have pointed out elsewhere and as Thomson clearly shows, there are at each stage at least two alternatives. Consider the first bipolar factor. Which are the negative saturations to be converted to zero and so eliminated? Those of Tests b, 4, 5, 6, 7 and 8? Then the 'speed factor' will emerge as a positive 'ability.' But such an allotment of negative signs is quite arbitrary. We might just as well give them to Tests 1, 2, 3, and 9. In that case a different factor, which Thomson calls Y, emerges as a positive ability. And much the same dilemma confronts us at every subsequent stage, so that we are continually offered a choice between two or more sets of rotated factor-saturations (cf. his Tables IX and X).

Now I suggest that, if we have already carried out an analysis by the simple summation or 'centroid' method, *the clue to the classification is at once given by the dichotomies* that naturally and immediately result. These (except when devoid of statistical significance) must be preserved by the rotation. If these resulting classifications appear 'psychologically meaningless,' that is not because the unrotated factors as such are destitute of meaning, but rather because we have started with an ill-considered selection of tests.

(b) But—and this is my second criticism—if we believe that our selection of tests is sufficiently discontinuous to warrant a sharp sub-division into positive group-factors (that is, into factors having positive loadings for a few tests and zero loadings for the rest) then it is waste of time to "take two bites at the cherry" (if I may borrow Thomson's phrase), i.e., to begin with an elaborate centroid analysis, and then proceed with an equally elaborate series of trial rotations. We can reach the same end with greater speed and certainty—and often with results that are far more 'meaningful' for the psychologist and educationist—by performing a 'group-factor analysis' at a single stroke.

I give the results of a group-factor analysis¹ in the last four columns of Table I. The size and distribution of the saturations suggest a combination of Thomson's two alternative rotations. Factors i and ii are found in both his rotated tables; factor iii only in his Table X; and factor iv only in his Table IX.

What, then, is the nature of the factors thus disclosed? First, those who have regarded Professor Thomson as an uncompromising opponent of any general factor such as *intelligence* will be interested to see that a marked general factor persists, and still dominates all the rotated factor-patterns. This factor, as he cautiously put it, is "possibly, but not necessarily, to be identified with *g*." On the whole, however, I think we

¹ Readers of this *Journal* will find a full explanation of the procedure ('factor analysis by submatrices') with an illustrative example in Vol. IX, pp. 51-8. It is based on the view of cognitive processes I have always held, namely, that the processes elicited by intellectual or educational tests are essentially a composite of one universal cognitive factor and one or more 'group-factors' (cf. *Relations of Educational Abilities*, 1917, p. 83, and other L.C.C. Reports). It may be added that in older papers by students or myself this procedure was somewhat vaguely termed 'method a'—'method b' being the procedure which yields one general and one or more bipolar factors (similar to those of Thomson's Table VIII).

may safely conclude that the tests were admirably selected for their primary purpose, namely, the testing of what is popularly called intelligence. Secondly, there are no signs of any very large *linguistic factor* entering into the Binet tests and requiring correction by the practical bias of the performance tests; but here we must remember that the choice of tests was hardly suited to demonstrate conclusively the existence or the influence of such a factor. Thirdly, there is fairly strong evidence for a *speed factor* entering into Tests 1, 2, and 3, and apparently affecting Test 9. Fourthly, the correlations between Tests 4, 5, and possibly others, suggest a visual factor characteristic of the *picture tests*. Finally, there seems to be yet another factor common to those performance tests that are not measured in terms of mere speed (namely, Tests 6, 7, and 8) and the Binet tests: this, Thomson suggests, may be a *space-factor*.¹

So far as the main object of the original research is concerned, Professor Thomson infers that "the common factor which seems to run through both the Binet and the Performance tests is perhaps a more suitable measure of a child's ability than the Binet I.Q. alone." And the factorial analysis which he has carried out will enable us to calculate regression coefficients yielding the best available estimates of that common factor either from the whole set, or from the eight performance tests alone, or from the most effective two or three. If the practical teacher or the clinic doctor protests that he will never have time or ability to calculate a regression equation before assessing his pupils or his patients, and concludes that the statistical studies can have no interest for him, there is an obvious reply. Professor Thomson demonstrates that, *with the raw scores of three tests only*, we can obtain, by the simple process of adding the figures as they stand,² estimates of the common factor which are almost as good as the weighted estimates derived from the whole series. Simple addition perhaps is the course that the practical teacher would have followed in any case. But only a formal statistical analysis can assure him that such a course is justified. Mathematically a factor (this at least is my own contention) is just an average; and here we are merely proposing to treat them as unweighted averages instead of as weighted averages. Naturally, the multiple correlation is slightly reduced; but only from about .90 to .85.

¹ I myself suspect that the saturation coefficients here really represent, or incorporate, the missing verbal or linguistic factor. But the nature of a given factor should, in my view, be ultimately decided by *introspective* evidence, which factorists hardly ever cite. I will only add that what appear to be spatial problems are very commonly solved by the successful child of ten or eleven by verbal methods, not by visual.

² Of course, with a correction for age if children of different ages are to be compared.

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Essential as these technical studies are to an accurate scientific validation of our practical proceedings, it is becoming in these days increasingly difficult to carry out elaborate statistical analyses or to publish elaborate statistical tables. The best thanks of every educational psychologist are, therefore, due to Professor Thomson and his collaborators, to the Scottish Council for Research in Education, to the Thomson Research Fund, to the Scientific Computing Service, Ltd., and finally to the University of London Press, for the parts they have severally taken in planning, carrying out, financing, and publishing a most instructive statistical inquiry. It need hardly be added that the several chapters are written in that compact and lucid style which always enables Professor Thomson to make clear even to the non-mathematician the somewhat technical arguments that inevitably arise, and that the book itself is produced, in spite of war conditions, with the usual excellence of the University of London Press.

CYRIL BURT.

OUTLINES OF RESEARCHES REPORTED IN THESES PRESENTED FOR HIGHER DEGREES OR DIPLOMAS

THESE OUTLINES MUST BE SUBMITTED THROUGH THE HEAD OF
THE DEPARTMENT IN WHICH THE RESEARCH WAS CARRIED OUT.

The Relative Efficiency of Different Lengths of Practice Periods in School Learning.

Thesis accepted for the Ed.B. Degree, Glasgow University, 1940.

By L. B. YOUNG.

PREVIOUS experimental work on distribution of learning periods has indicated the complexity of the problem. The optimum distribution appears to be affected by the nature of the material, the size of the work units, and the intervals between practice periods, the experimental set-up and the criterion of learning employed (speed, accuracy, amount learned, etc.), the age and intelligence of the subjects, their stage of learning, their interest and motivation, and by the factors of practice and fatigue. The present investigation only aims therefore to reach conclusions valid within narrow limits. But since it was carried out with children (not with adults, or lower animals), and since it employed material which is typical of ordinary school-work, its results should have direct educational applications.

The subjects were taken from three primary school classes, and were of average age 11 years 2 months (S.D. $4\frac{1}{2}$ months). The numbers completing each experiment appear in the table below. Each class was sub-divided into Groups A, B and C, which worked for different lengths of practice period, but which were closely matched for age, intelligence (as measured by Tomlinson's *Northern Test* and *Simplex Junior*), and for initial ability in the material to be learned. The children in Group A for spelling were assigned to Group B or C for poetry and arithmetic, and *vice versa*. Each group had the same total amount of practice with any one material, all of which was completed within one week; but the practice was differently distributed through the week, as shown in the table.

The practice materials, and methods of scoring, were as follows:

SPELLING.—Two hundred words of suitable difficulty were chosen. These were learned during the practice periods on four days and tested on the fifth day. Score=total words learned.

POETRY.—A poem of twenty 6-line stanzas was studied for four days. On the fifth day the first line of each stanza was given, and pupils wrote out all that they could recall. Score=total words.

MENTAL ARITHMETIC.—Four hundred problems were given out on duplicated sheets, with space for answers. Score=total figures correct in the four days' work.

MECHANICAL ARITHMETIC.—One hundred and eight problems in each of the four rules were worked in rotation. Score=total figures correct.

With both kinds of arithmetic a further fifteen minutes was worked on the fifth day, so as to provide a measure of improvement over the work of the first fifteen minutes on the first day.

The scheme of the investigation, and the results, are given in the following table:

<i>Material.</i>	<i>Group.</i>	<i>No. of Subjects.</i>	<i>Practice Period : mins.</i>	<i>Distribution over Four Days.</i>	<i>Total Practice Time : mins.</i>	<i>Mean Score.</i>	<i>S.E.m.</i>
Spelling ..	A.	23	10	Twice a day	80	128.1	8.25
	B.	23	20	Once a day.....	80	110.7	10.16
	C.	23	40	First and third days	80	98.7	9.49
Poetry ..	A.	24	10	Twice a day	80	351.3	27.18
	B.	24	20	Once a day.....	80	367.7	19.87
	C.	24	40	First and third days	80	346.9	23.63
Mental Arithmetic.	A.	38	15	Twice a day	120	183.2	12.85
	B.	38	30	Once a day.....	120	161.4	11.46
	C.	38	60	First and third days	120	128.9	9.26
Mechanical Arithmetic.	A.	40	15	Twice a day	120	1603.6	80.80
	B.	40	30	Once a day.....	120	1558.4	66.84
	C.	40	60	First and third days	120	1389.3	74.59

Owing to the great variability of individual scores, and the small numbers of cases, the differences between the mean scores of Groups A, B and C are seldom statistically significant. Using Fisher's *t* method, the differences which approach significance are: Spelling A-C, probability=.03; Mental Arithmetic, B-C, probability=.03; A-C, probability=.003; Mechanical Arithmetic, A-C, probability=.06.

The improvements in arithmetic between the first and fifth days were as follows:

<i>Material.</i>	<i>Group.</i>	<i>Practice Period.</i>	<i>Mean Improvement.</i>	<i>S.E.m.</i>
Mental Arithmetic.....	A.	15	11.03	0.86
	B.	30	8.50	0.65
	C.	60	6.34	0.67
Mechanical Arithmetic	A.	15	66.9	4.21
	B.	30	74.7	4.21
	C.	60	64.5	4.32

For mental arithmetic, A-B and B-C both have probabilities of .03. For mechanical arithmetic the largest difference, B-C, has a probability of only .10.

The following conclusions are indicated:

(1) Individual differences between different pupils are so large that it is doubtful whether any generalizations as to distribution of learning periods apply to all individuals.

(2) In spelling the shortest practice periods (ten minutes) probably give the best results. This confirms previous experimental evidence that the learning of disconnected material, such as digits or words, is most efficiently done in short periods.

(3) With poetry the results are not significant, though they suggest that practice periods of twenty minutes are more efficient than longer or shorter periods.

(4) Problem arithmetic causes considerable mental strain, and the shortest (fifteen minutes) period definitely gives the best total output, and produces the greatest ultimate improvement in efficiency.

(5) With formal or mechanical arithmetic, results are less conclusive. The longest periods (sixty minutes) are probably inefficient, both from the point of view of total output and of improvement.

(6) The work done during each 3-minute period of mechanical arithmetic was graphed, in an attempt to find whether, after a certain number of such periods, there was a marked decline in output due to fatigue. In all the groups, however, it was found that there was a continuous and fairly regular decline throughout the fifteen, thirty or sixty minutes of work.

(7) The arithmetic records also yielded measures of fatigability (decline in work done between the first and last fifteen minutes of an hour), and of variability in successive 3-minute periods. Both these measures correlated negatively with total output in arithmetic, namely, $-.59 \pm .066$ and $-.62 \pm .064$. The better arithmeticians are both less easily fatigued, and more steady in their work.

BOOK REVIEWS.

The Innumerable Instincts of Man: By CLARKE R. CLAREMONT, B.Sc., A.C.G.I., with Prefaces by P. B. BALLARD and H. R. HAMLEY. (London: Eyre and Spottiswoode, 1940, pp. 196. 6s. net.)

Perhaps the most surprising feature of this astonishing book is the high standing of Mr. Claremont's guarantors. Professor Hamley's statement that this is the work of a trained scientist and Dr. Ballard's that this contribution to the theory of instinct "merits the close attention of professional psychologists," can only be characterized as singularly inept. From the first chapter—"A Scientist's Profession of Scientific Faith"—to the last—"The Transformation of Social Psychology"—the whole tone of the book is the antithesis of scientific. The lack of clarity, the lighthearted flippancy, the hypostatizing of general terms like 'nature,' 'intelligence,' and a host of others, the indiscriminating, misleading and fragmentary references, the recurring propaganda in favour of the Montessori method—these are not the characters of a scientific presentation. As to meriting the attention of the psychologist, even the author himself on his first page expresses his own uncertainty in this regard. Frankly, had it not been for the two names on the title-page the present writer would not have troubled to review the book. In spite of the wealth of new data to which the author refers, his discussion is again and again reminiscent of the century-old discussion of instinct in Kirby and Spence's *Entomology* and at times there is an echo of the still earlier *Instinctus Naturalis* of Lord Herbert of Cherbury. Under these circumstances it not infrequently happens, as one might expect, that the implications of one chapter are inconsistent with the conclusions reached in the next.

The book is really of no importance psychologically. The author's ideas regarding instinct are entirely too nebulous. One may apply his own words: "Directly one asks what it means one sees that it means nothing." He simply does not know his stuff. It is the merest nonsense to say, as he does, that, when he has, in his own opinion, disposed of Pavlov's theory, "with it, of course, goes the Behaviourist School of Watson, from the bottom up." Then again he appears to be quite unaware of the original meaning of "instinct" as "animal impulse" and of the history of the concept from Greek times on. It is really the biologist who has confused the issue with his identification of "instinct" with a form or phase of behaviour. To say that "instinct does the right thing without knowing why" and that "this is the central point" of his formula, also sounds something like nonsense. Nothing but their amazing fecundity saves some of the lower orders of life from extinction because they are "prompted by instinct" to do the *wrong* thing.

If the book is unimportant from a psychological point of view it may be positively dangerous from the point of view of the educator. The indiscriminating application in educational practice, for example, of the formula just mentioned might have very undesirable consequences. Yet if that is not the chief educational lesson the book is intended to teach, it is difficult to see that it has any bearing whatever on the work of the educator.

J.D.

Alfred Adler, the Man and His Work: By HERTHA ORGLER, Foreword by O. H. WOODCOCK, M.D. (C. W. Daniel Co., Ltd., London, pp. 236. 8s. 6d.)

To the author of this study of Adler and his work, the title "the standard bearer of individual psychology" was given by Adler himself. The book is a blend of a brief autobiography of Adler and a study of his teachings. This latter is unfortunately by no means a critical one; it is expository and dogmatic in style. It may, however, serve well as a popular introduction to the study of Adler's work. The personal setting undoubtedly makes much of his doctrine more interesting, and more comprehensible, but as a serious examination of Adler's position it is not of much value, and that value is lessened by there being no exact references to original sources in Adler's writings, and no index.

It is interesting to note that the author, firm believer as she is in Adler's theories, regards his personality as an important factor in his cures. She speaks of his "emanating a quieting magic," and "he was even able to quiet raving maniacs and to cure them" (p. 24).

Difficulties familiar to students of Adler recur here. Thus heredity is said to determine abilities but not character: nor does environment entirely determine character, the child's own creative power being the chief factor. But whence comes this if it is not innate?

Much is made of the 'life-style' as a determining influence of the individual, though it is not clear what precisely this is. Three 'entrance gates to psychic life' are discussed: the child's position in relation to other children in the family, first memories, and dreams. Then follows a chapter on the inferiority complex, and one on the three problems of life—social interest, occupation, love and marriage.

The book concludes with a brief history of the development of individual psychology and chapters on Adler's personality and the significance of his work.

C.W.V.

Child Psychology: By FOWLER D. BROOKES, with the collaboration of LAWRENCE F. SCHAFFER. (Methuen, pp. 600. 12s. 6d. net.)

The introduction to this book, by an anonymous editor, is right in describing it as "surprisingly comprehensive" and as "lucidly written." The former statement is borne out by a mere glance at the contents. These include not only such fundamental topics as heredity; pre-natal development and structure; a somewhat detailed study of development in early infancy, including sensory development; a substantial section on physical development, growth in height, in weight, and of the nervous system, and the later development of physical and mental characteristics. There are also more "practical" topics such as the growth and measurement of intelligence, the study of moral development and personality, problem children and their treatment. The volume concludes with a substantial chapter on the prediction, guidance, and control of child behaviour.

A very wide range of literature has been covered, but this consists almost entirely of American works. One is used to the neglect of British workers in American books on psychology (especially child psychology), but it is surprising to find in so comprehensive a book as this practically no references to Freud, and very few to Adler. However, the book is large enough as it is, and it is useful to an English reader to have so wide a survey of American literature brought together in one volume. The treatment seems to us generally sound and impartial. At times, however, statements which are interesting and important (if true) are accompanied by few or no references to evidence. Also, the treatment is apt at times to be superficial and hurried; but that again, perhaps, is an almost necessary accompaniment to such a comprehensive work. The chief value of the book then, for the student of child psychology, will be in its providing, not so much thorough, penetrating discussions of individual topics, but an excellent introductory guide book to American literature on all the various subjects treated.

Environment and Heredity: By OLIVE D. MAGUINNESS. (London: T. Nelson and Sons, Ltd., pp. xii+216. 2s. 6d. net.)

Dr. Maguinness has added an extremely interesting and useful volume to Nelson's Discussion Books. In the early chapters she deals with Mendelism, The Physical Basis of Inheritance and Biometrics, and thus provides the scientific background necessary for the understanding of such questions as The Inheritance of Mental Characters, Intelligence and Social Class, The Inheritance of Acquired Characters, and Heredity and Social Affairs. The topics dealt with are of considerable social importance, the discussion of which is often marked by the absence of real knowledge, and by much loose and prejudiced thinking. This book, if widely read, should do much to remove this ignorance and lead to greater clarity of thought on these issues. It should be useful in discussion groups and in many adult education classes.

Human Development and Learning : By FRANK S. SALISBURY. (McGraw Hill, pp. 498. 18s.)

This text-book gives a comprehensive introduction to the study of educational psychology. After a chapter which explains the methods of the psychologist and outlines some of his problems, the author goes on to deal with such fundamental topics as the physiological bases of behaviour, the influences of heredity and environment, instincts and the development of emotional life, learning, thinking, mental tests, æsthetic experience, personality, etc. The contribution to child psychology made by workers of different points of view is clearly brought out and detailed accounts are given of some of the experiments of Köhler, Thorndike, Bühler, and others. An attempt is made to train the student to observe carefully himself, for at the end of each chapter there are suggested topics for observation and entry into a psychological notebook ; in each case this is supplemented by lists of useful reading.

There is little that is original in this book, but it is a careful and useful collection of material from many sources. The style is perhaps somewhat verbose, but the explanations are clear, and the book should be helpful particularly to those students who find the subject matter and terminology of the ordinary text-book difficult.

The Psychology of Punishment : By ARTHUR B. ALLEN, L.C.P., F.R.S.A., A.Coll.H., in collaboration with EVAN H. WILLIAMS. (Allman, pp. 148. 5s.)

There are excellent ideals put forward in this book by practical teachers : for example that one should try to win over children and youth by sympathy, and by an appeal to the best that is in them, rather than by suspicion and severity, and indeed that one should try to do without any punishment at all, in particular banning corporal punishment. We have no doubt that the author was very successful himself in the handling of his pupils, but the psychological arguments in favour of his views are scrappy, and at times unconvincing, in spite of the many quotations from a great many modern writers. He records a number of individual cases in which his methods have been successful, but there is an inadequate allowance for particular personal influences and also for those resistant natures who take advantage of trust rather than respond to it. As regards corporal punishment, there is a tendency to use evidence, based on the bad effects of corporal punishment in many cases with adults and senior adolescents, to prove that it is never desirable or useful for younger boys, which by no means follows.

Training in Thought and Expression : By F. T. WOOD. (Macmillan, pp. 208. 2s. 6d.)

The first part of this book deals with the processes of thought and reasoning with the methods of propaganda, and the most common forms and causes of crooked thinking ; the second part is concerned with written English and style ; a brief discussion of the essentials of good style is followed by a list of suggested essay subjects, general exercises, and prose passages for study. The chapters are short and clearly sub-divided, and each is followed by carefully planned exercises in logical thinking and the use of words. This should prove a helpful and suggestive text-book for senior forms.

Predictable Accuracy in Examinations : By E. R. CLARKE. (London : Cambridge University Press, pp. 48. 5s. net.)

This is No. 24 of the Monograph Supplements of the *British Journal of Psychology*. It may be stated at the outset that the treatment of the topic is sufficiently new and weighty to justify the inclusion of the monograph in this important series. It is well to inform readers that the author is not concerned with the validity of the verdict given by an examination but with the degree of consistency of that verdict. A scheme is put forward which would enable the examiner to increase the consistency of his examinations and thus reduce the number of errors. An appreciable percentage of candidates at many examinations come to grief, not

because their abilities are too meagre, but because the reliabilities of those examinations are too low. This problem is worthy of study by all examiners, and Mr. Clarke's mathematical insight has enabled him to make a substantial contribution towards its solution.

The author finds the two usual statistics, namely, the difficulty of a test and the ability of the testee, insufficient, and he introduces a new statistic which he calls the 'coefficient of ubiquity.' The following quotations illustrate his standpoint: "The architecture of every mind is different, not only as between a restricted number of set subjects, but also in the infinite detail within the bounds of one set subject." "As a matter of experience a child can be inconsistent all along the line and the repercussions of this inconsistency are the bases of the whole argument." Although he admits that 'boys get reasonably consistent scores' yet he finds enough chaos to necessitate the use of the term 'ubiquity' or 'coefficient of inconsistency.' This procedure enables the author to present some valuable data. It is only when he begins to interpret these data that one may question whether his psychological acumen is quite on a par with his mathematical insight. The following passages could obviously be criticized on various counts: "Our conclusion is that the individuality of the individual must be accepted, and that there are no convenient or magic dimensions whereby a human being can be assessed comprehensively. To assess the individual in a comprehensive way we have got to give him a comprehensive examination." "This opinion is contrary to the general opinion of the factor analysts, who are admittedly seeking a sort of philosopher's stone of a few tests which will probe by a few magic thrusts to a sort of psychological fountain in a candidate from which all ability springs, and if strong with a leavening of law will make a good lawyer, or with a leavening of science will make a good doctor, and so on."

Let us select seven of the most prominent factor analysts in Great Britain and another seven from America. I suggest that not one of them would fit into the picture drawn above. The author is, of course, entitled to say that his own opinion is contrary to the general opinion of factor analysts. But if it is not backed by proof why refer to it in a monograph on reliability? After all, most factor analysts have faced the question of validity of a test as well as its reliability.

The author's procedure, which he defends, is to discuss deductions from his mathematical methods which appear later in the book. The reader may sometimes find this rather trying as, for example, in the last paragraph on page 2. The author refers to an examination of 100 tests for selecting the best 300 out of 1,000 candidates. Seventy-two mistakes were made—i.e., thirty-six passed who should have been failed and thirty-six failed who should have been passed. The author shows how the number of mistakes might be reduced from seventy-two to forty-one.

In actual practice, however, regard must be paid to mistakes due to low validity as well as to low reliability.

These few references may serve to show the thought-provoking nature of the book. It is worthy of serious study. Moreover, readers possessing sufficient knowledge will also be able to appreciate the mathematical portions of the monograph.

LL.W.J.

Proceedings of a Conference on Examinations. Dinard, 1938. Edited by P. MONROE. (Columbia University Press, \$3.50.)

It has often been said that the social opportunities of conferences are their greatest asset. If this be true the worthies who attended the Third International Conference on Examinations, held at Dinard in 1938, must have had a splendid time, for if addresses, papers and debates seem to have attained a high order of value, so much the more so must the social activities.

This Conference was no mere play. The programme was full and the papers contained meat in abundance. It is impossible within a limited space to give a précis of the report; but one can refer to it as a useful addition to the literature that has recently grown up round the vexed question of examinations, even while one notes that the discussions were not confined to this topic solely.

At an international conference it is to be expected that one would learn what measures are taken by people elsewhere to probe the effects of education and for

purposes of selection. The report does not disappoint the reader. French, Finnish, Norwegian, Swedish, and American ideas are described at some length. The difficult problem and methods of examining composition were discussed, yet with the usual lack of finality. The conclusion that is left in the reviewer's mind is that unless and until a panel of examiners agrees to mark upon a preconceived plan, and adheres closely to it while marking, the variations complained about between the marks will always occur. At one of the meetings delegates said what they expected to emerge from an essay, and in this connection M. Declos' suggestion of the writer's personality is worth attention.

The student of comparative education will find material for study in this report, and, as would be expected, many remarks, some occurring in the papers and some in discussion, will prompt ideas for various further researches. Thus the report fulfils a part of its purpose for those who were not able to attend the conference itself. In any event, the deliberations of a distinguished body of people like that in consultation at Dinard in 1938 cannot fail to have manifold interest for educationists. It may be long before other meetings of the kind can be held, so this report of the Third Conference on Examinations has historical significance.

A.P.B.

Guidance for the High School Pupil: By E. C. WEBSTER. (McGill University, Montreal, 1939, pp. 153. \$1.75, obtainable from the Oxford University Press.)

This volume is No. 8 in the McGill Social Research Series and is based on five years of research in Protestant schools of the City of Montreal. The general plan adopted was to administer psychological tests, including intelligence tests of various kinds, tests of clerical and mechanical abilities, and tests of educational achievement to boys in the first year of secondary school (Grade VIII) and to follow their progress as denoted by grade promotions and school marks. Grade VIII is a vital turning-point. The pupil has to choose among four curricula. A matriculation course via Latin or via science, or a course leading to commercial and clerical vocations, or a general course leading nowhere in particular. Pupils taking Latin were superior to those taking science or commercial subjects, while pupils taking the general course were inferior. Pupils believed certain courses to be easier than others. This kind of choice rather than the "interest-value" of the subjects was certainly a determinant. But the belief in the greater ease of the alternatives is an illusion, for the average pupil completing each of the four courses had an I.Q. of at least 113, as differences in intellectual level had by the end of Grade XI disappeared.

There was no evidence that bilingual children suffered any adverse effects, although the author is careful to point out that the number of pupils is not large enough to place the question beyond doubt, especially as the degree of bilingualism was not controlled. Matched age for age Jewish pupils made lower scores than English pupils in the intelligence tests employed, whether verbal or non-verbal. (Grade VII classes in elementary schools.) Yet in school marks the Jewish pupils were superior. Thus the author suggests that the Jewish pupils in Grade VII are not under a language handicap which interferes with school work. Moreover they have more incentive in the way of educational ambition. The author's investigations into the meaning of school marks are a welcome addition to the vast literature on this topic.

Some of his conclusions only bear on the special features of the educational structure in Montreal, but others are closely related to the well-known enquiries into the predictive value of examinations and tests which have been reported or reviewed in this JOURNAL. The author makes a strong plea for guidance based upon a systematic study of the pupil in relation to his environment.

He concludes that a "secondary school course which provides a satisfactory education to only 20 per cent of the pupils commencing it, is a luxury we cannot afford," and recommends that "Guidance service in remedial training, choice of school subjects, and choice of occupation needs to be developed for the school system as a whole with a competent director in charge."

The book may be warmly recommended and should be on the shelves of every research worker in the field of vocational guidance.

LL.W.J.

The Educational Needs of the 14-15 Group: By ARTHUR GREENOUGH.
(University of London Press, pp. 182. 3s. 6d. net.)

Teachers in senior schools and educational administrators will find much to interest them in this book, which contains an account of what was done in an industrial area of the North Midlands to meet the problems peculiar to the group of scholars for which senior schools must now provide. Quite naturally these problems have often been examined from the angle of the school to which the Education Act (1936) gave a special and extra responsibility; but Mr. Greenough takes a different view. No doubt it is shared by large numbers of teachers, and he would be far from claiming originality for it. Approaching the problems from the scholar's side he shows how the elasticity of what are termed 'Free Groups' can serve several important purposes. What is taught in school is none the less educational because its usefulness is apparent to the scholar. Mr. Greenough appears to make this utility appeal to his scholars to whom he has allowed considerable freedom in the choice of studies, and he manages, by means of centres of interest, a seven-day time-table, a modified Dalton plan, and other devices to meet difficulties arising from two sources well known of teachers, viz.: (a) how to pursue work in school during that year in which employment may be taken up and (b) how to make work really worth while for the scholar who for one reason or other is obliged to return to school after a period of employment. The problem of re-absorption into the life of the school after temporary absence is apparently solved by the method described in this book.

Besides the description of Mr. Greenough's 'experiment,' there is a clear picture of the young persons' needs at the age under consideration and a discussion of the educational function of the school. Mr. Greenough's 'credo' sets out several valuable ideals giving the teacher and administrator plenty to bite upon. Although it may not be feasible to adopt the system in its entirety in other places where there are different conditions, Mr. Greenough's principles are so clearly set out that none should find any trouble in reorientating the organization of school and curriculum in a system of which the value has been proved.

Mr. Greenough is to be congratulated upon his apparent success, and one may hope that others following his footsteps may be equally successful.

A.P.B.

The Educational Needs of a Rural Community: By WILLIAM C. RADFORD.
(Melbourne University Press in association with Oxford University Press, pp. 180. 6s.)

The author of this book regards education not as a vague general process through which it is desirable that all human beings should pass, but as a specific inter-relation of personality and environment.

He examines the needs of a clearly-defined community and proceeds to determine how far they are being met. The particular community is in a rural district in Victoria, but the book is not solely an educational or sociological survey; for the investigation is guided by recognized principles of general educative science, and at the same time results in a clarification of such principles. Just as the old recipe for juggled hare begins by saying, "First catch your hare," so Mr. Radford first ascertains the actual life conditions in the area under consideration before organizing the necessary educational activities in accordance with the results of his enquiry. Though this 'looking before and after' causes some pining for what is not, and though many details are not of vital interest to every reader, there is so much illumination of problems which are of general concern to educationists in every community that the book should prove of value to any student of education, besides forming a model of the painstaking research required in any country before the educationist can serve his day and generation in the way indicated by education as a science; that is, every educational problem is three-fold: "What has Nature provided for the educand?" "How has the environment modified the provision made by Nature?" and "What is to be done so that both the individual directly and the environment indirectly can be further modified in the best possible way?"

What Do Boys and Girls Read? By A. J. JENKINSON. (Methuen, pp. 283. 7s. 6d.)

This is an account of a very valuable research into the reading habits and tastes of boys and girls, aged 12+–15+, in the middle forms of secondary schools and in senior schools. A questionnaire was given to boys and girls in seventeen senior and eleven secondary schools to discover what books, newspapers and periodicals they had read in the past month out of school time, and in silent reading periods in school; whether poetry and plays were read of their own free will by these younger adolescents, and how often they went to the cinema.

A further questionnaire answered by the teachers aims at discovering the literature syllabuses studied by the boys and girls in school, and the attitude of the teachers to 'bloods' and to the cinema.

The results of these questionnaires are such as to give most teachers of English pause for reflection. They suggest that taste in literature is influenced far less by school syllabuses than by natural stages of growth and development; and that those stages are not sufficiently recognized by the average teacher, who, conscious of the short time the pupil will be in school, tries to instil a taste for adult literature for which the adolescent is not yet ready. Syllabuses need, in many cases, drastic revision; more use could be made of silent reading periods in school; and more sympathetic attention should be paid to the 'bloods' (i.e., penny dreadfuls, school stories, etc.) which the boys and girls naturally enjoy, for these throw much light on their emotional and social development. Neither is enough systematic use made of the cinema, which probably exerts a greater influence on adolescents than any other art form.

Throughout there is an appeal for greater understanding of the psychological development of pupils from 12+–15+ and a planning of school work in the light of that understanding. Interesting suggestions for further research are made, and the book is a valuable contribution to modern educational theory and practice.

M.C.P.

Dangerous Thoughts: By LANCELOT HOGBEN. (London: George Allen and Unwin, pp. 283. 8s. 6d. net.)

Prof. Lancelot Hogben has gathered together into this book a number of his articles and lectures. The result is a volume containing a great deal that is thought-provoking, much that is illuminating, and much that is devastatingly critical. His subjects range from "The Creed of a Scientific Humanist" to "The Contemporary Challenge to Freedom of Thought"; he writes on "Race and Prejudice" and "Planning for Human Survival"; his essay on Havelock Ellis is fittingly included; his lecture to teachers on "Science in the School" is reprinted; two lectures on "Adult Education To-day" and "Education for an Age of Plenty" reveal the author as a severe critic of some aspects of adult educational work to-day; on "John W. Wilkins, Parliamentarian and Pioneer of Scientific Humanism" and on "Sir William Petty and Political Arithmetic," show the researcher at work. There are other contributions also; the whole book will be read by many with very great pleasure; some may be tempted to suggest that the title is really appropriate; but others may be encouraged seriously to quarrel with the author often. Some perhaps may be encouraged to do something to modify some of the conditions which call forth the writer's very damaging criticisms.

Life in the Nursery School: By LILIAN DE LISSA. (Longmans, pp. 250. 7s. 6d.)

Miss Lilian de Lissa's book will be welcomed by all who are interested in the development of young children.

She begins by a study of the child's growth and gives much practical advice on the maintenance of his physical health. She then goes on to consider the growth of the child's intelligence, his mastery of speech 'as a means to, as well as an indication of, his psychological growth,' his progress in emotional stability and social adjustment.

She shows how the nursery school can assist this growth by careful planning of the child's environment, rather than by organization of his occupations. She stresses the importance of studying the needs of each child, so that the right material can be offered him at each stage of his development, giving detailed suggestions for suitable play material.

The chapter on "Religion in Early Childhood" is a particularly helpful contribution to a difficult question. The importance of example, and the assurance of love and trust in his adult world, are shown to be the essential basis of the small child's conception of God, which is fostered by the world of nature.

There are suggestions for the nursery school garden, a survey of pre-school education in this and other countries, and a scheme for recording observations of the child's development. The composite pictures illustrating the use and value of simple play material are an attractive addition to a book which in its ideals is as inspiring as it is stimulating in its ideas.

L.C.

Borrowed Children—Evacuation Problems and their Remedies: By Mrs. ST. LOE STRACHEY, O.B.E., J.P. (London: John Murray, 1940, pp. xiv+134. 1s. 6d.)

This interesting and comprehensive little book concerns problems arising out of the evacuation of school children. Basing her observations on her own experience and that of friends in the other areas, Mrs. Strachey gives a sympathetic description of the arrival of the children in the reception areas and their first reactions to country life. A series of case histories show that the 'difficult children' are often anxious or afraid, but that, as soon as they feel secure, their behaviour becomes normal. The role which the 'hostess' should play is fully discussed. Cases of theft, enuresis and other troubles are cited, and indicate clearly that 'difficulties of children are only developed and not caused by evacuation,' and that the expert help which Child Guidance Clinics can give to both hostesses and children is invaluable. The second section describes organizations for safeguarding the mental health of the children. Reports from some areas are included. The serious problem of the non-evacuated school children is touched upon. Finally, the respective merits of camps and billets are discussed, and the important conclusions, drawn by various investigators into the evacuation scheme, are given as a guide for the future.

The Measurement of Abilities: By P. E. VERNON. (London: University of London Press, Ltd., pp. xii+308. 10s. 6d. net.)

Dr. Vernon has written an extremely useful book which will find a place on the shelves of the libraries of all psychological laboratories, of many research workers, mental testers, teachers, doctors, clinic and social workers, and psychologists; and it will not remain on the shelves, for it will be continually referred to.

The author has found, as have so many others, that most of the standard text-books on statistical methods are too difficult for many students of psychology. He has therefore dealt with the essentials of these methods in the earlier portions of this book, and has illustrated the principles by reference to many psychological and educational problems. He has succeeded, to a marked degree, in making plain much that often remains obscure in those text-books mainly concerned with technical or mathematical details.

In the later parts of the book Dr. Vernon deals lucidly with the principles of test construction and application, with the interpretations of tests and examinations, with the new-type examinations, and with many recent improvements in examining. Readers will find the classified list of educational and intelligence tests of use. The critical comments on mental tests and the many hints to testers contain much timely advice, attention to which would prevent a great deal of the uninformed criticism against some and the extravagant claims made for mental testing to-day. An extensive bibliography completes the book.

The Growth of Understanding of Geographical Terms in Grades IV to VII :

By T. J. ESKRIDGE, Junr. (Duke University Press, pp. 67. \$1.)

This is the published version of a Ph.D. thesis. It is a methodical arrangement of the results of the application of multiple choice and other tests based upon the common vocabulary of four text-books used in the three schools tested, in Greenwood, South Carolina. The summary and conclusions seem to be related "associatively" rather than "basically" to the test results. The statistical treatment, comparison of median scores, is inadequate. Thus class groups are compared by the juxtaposition of median mental age and median test score, instead of grouping pupils of the same mental age together and examining the distribution of their test scores. Statements such as "...the writer *felt* that a greater number of cases..." and "...the writer *believes* that the same kinds of data would be obtained..." betray too subjective an attitude to satisfy most critical readers.

E.J.G.B.

Child Care and Training : By MARION L. FAEGRE and JOHN E. ANDERSON.

(Minnesota Press, pp. iv+320. \$2.50.)

This is the fifth edition of a book which is obviously popular, and deservedly so. While it does not contain much psychology that will be new even to one who has not read widely in the subject, the psychological background seems to us very sound, as one would expect in a book in which Dr. Anderson has shared. The exposition is extremely simple and clear, so that the book is eminently suitable for parents who want to read a little about child psychology, and to get some practical advice on the bringing up of children. It is interesting to an Englishman to note that the University of Minnesota apparently has, not only a Professor of Parent Education, but an Assistant Professor, a post which is held by Miss Faegre.

Parents and Children : By HUGH KINGSMILL. (Cressett Press, pp. 218.

2s. 6d.)

Mr. Kingsmill, who is no novice at making anthologies, has here gathered together a very interesting collection of brief records showing the relations between a great many writers and other prominent men in our own modern history, and their parents. The period covered ranges from Roger Ascham and Sir Walter Raleigh to Edmund Gosse and Daphne du Maurier. We have only one criticism; perhaps it would have been better to have given more space to a rather smaller number of families. As it is the book tends to be a collection of very brief sketches rather than full-length portraits.

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PREPARED BY JANET M. R. CHRISTIE.

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